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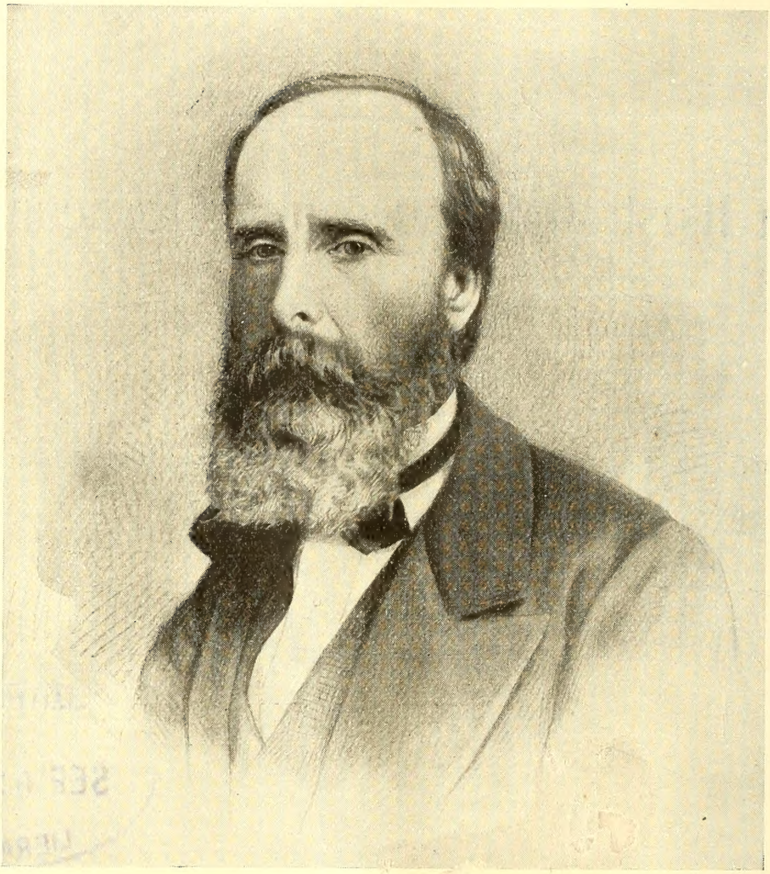

To the Memory of

JOHN HENDERSON

Flushing, Long Island

FLORIST AND PHILANTHROPIST

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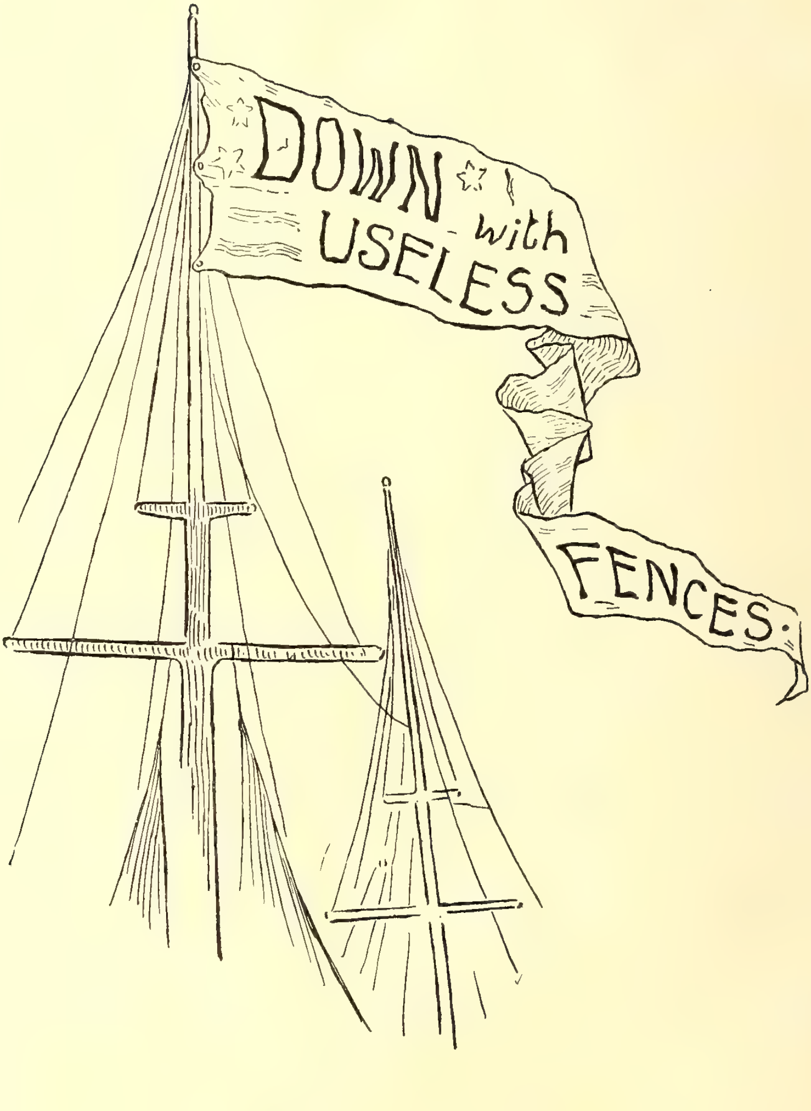
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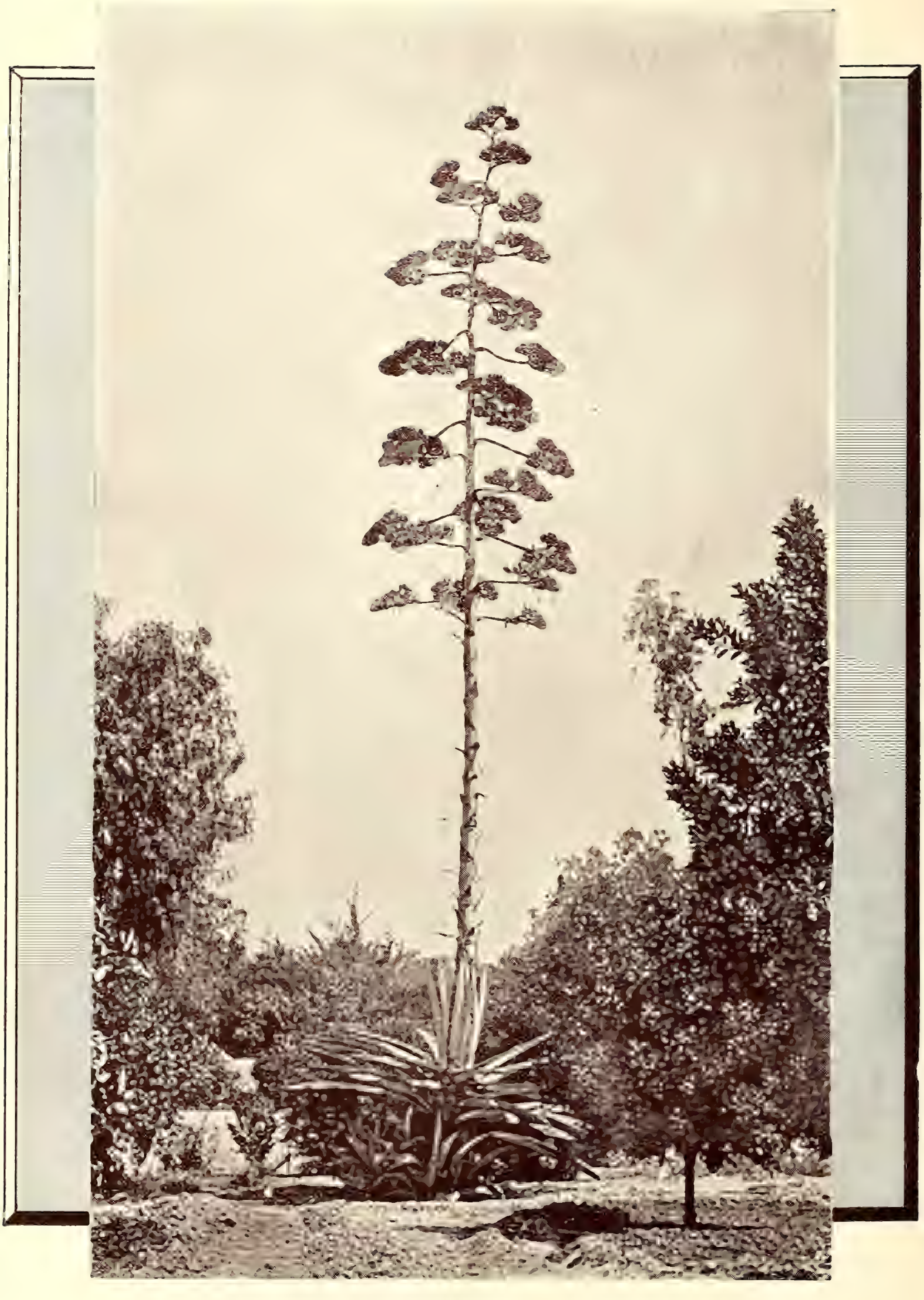


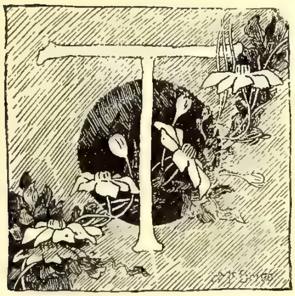
A Century Plant in Bloom in Southern California.

The American Garden.

Vol. XI. JANUARY, 1890. No. 1.

SOME ASPECTS OF OLD ORCHARDS.

FACES IN TREES—THE REVIVIFYING OF NEGLECTED NEW ENGLAND FARMS.



TO ONE who rambles often through the woods and fields of our northern states, old orchards form an interesting and suggestive study. One is constantly coming upon them in unexpected places—such for instance, as the midst of a second growth of timber, or a lonely hill side, miles from any habitation.

During a recent walk I discovered three of these mournful assemblages of old, gnarled, worn-out streets. I say "mournful," for there is something about an abandoned and degenerated orchard which inspires a feeling of melancholy. Coming suddenly upon it, in forest or field, and pausing to note the general atmosphere of neglect and decay, one can hardly help entertaining some such thoughts as, we may imagine, will pass through the mind of Macaulay's New Zealander, seated on the broken arch of London Bridge.

This feeling of melancholy springs perhaps from the suggestion which an abandoned orchard conveys of the decay of farm-life, for a little search usually serves to discover the ruins of a farm house. Or it may be part of a recently deserted farm. The land about is untilled and running down. These old trees are only part of the general picture of decay. It all suggests the breaking up of the old-time rural communities; the drift of young manhood and womanhood from country to city; the insane fever for Western emigration; the impoverishment of the soil and the decline of home industry in this and other once prosperous sections, by the withdrawal of money and youthful energy into other parts.

And yet it does not seem as if this condition of affairs could continue much longer without a reaction. For congestion in society, as well as in the body, provokes reaction. Our cities are congested with people and it would seem as if there must be a return wave into the rural sections pretty soon. It has already started.

Has not even the great West, in spite of its boundless territory and undeveloped resources, had a growth too rapid to be normal or substantial? The typical Western community is a Shantytown, not a Solidville. The West is panicy, feverish, insecure. It has grown too fast. Notice how many of the enterprising young men who go out there to make their fortunes come back again and settle in Eastern communities. Some are New Englanders, and they are returning to the old neglected farms. Before many years we shall see the reaction taking effect. But as yet the old orchard typifies the condition of much of New England farm-life. It has reached the lowest point of a long decline.

There is a still more potent reason for the melancholy of an old orchard's venerable, misshapen, sterile trees. It is that, though they live and cumber the ground, they have passed the point of usefulness in the world.

We see the ground about us here strewn with apples, but every one is an apple of Sodom. The cattle will not eat them; the squirrels will not nibble them; even the worms will not burrow in them. They are intolerably bitter and sour. Look into

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this for a sad picture. Think of a life that has passed the point of producing anything but bitter fruit—the peevish, complaining disposition of a life that has ended in neglect and failure. Think of a man in his old age producing nothing but windfalls. But even this is not the worst. Think of such a condition as the result of necessity and not one's own faults. These poor old trees are still bravely striving to produce good fruit. Year after year they try to convert the sunlight and the earth's juices into something like the sweet apples of old. But they fail, and fail through no fault of their own. I can conceive a man's being so hedged in by circumstances, so crippled by necessity and the fault of others, that his life shall culminate in failure, in spite of his most heroic efforts to achieve success. It is the saddest thing imaginable; but these struggling old trees make the picture real.

Another source of melancholy is the natural sadness of old age. Under the most favorable conditions, these trees would be growing old and barren. Yet after all this is a calm, sweet sadness, like that which marks the peaceful close of a beautiful day. It is the evident intention of God that man should grow old gracefully. All the processes of nature adjust themselves to this beneficent design. If a good man dies before his natural powers are abated, he falls, like a fertile tree, with his boughs full of golden fruit, his work unfinished.

There is one more aspect of this old orchard. There are trees here which produce in me the definite impression that they have suffered. Did you ever notice that every tree has its face—a face that looks out at you with almost as distinct a personality and character as if it were human? I have seen such wrinkled, suffering faces looking out of crooked and misshapen trees. This orchard is full of them. For here are trees that have wrestled with great winds; that have fought for very life in a rocky and sterile soil; that have been frozen to the core by pitiless frosts. Look at that gnarled old giant yonder! How it has suffered! You see it in the leaning trunk; the branches stooping toward the ground, as one stoops in physical agony; the contorted limbs, the painful irregularity of the whole tree. The face that looks out of that tree is seamed with suffering. It is just such a face as I have seen hundreds of times in people who have struggled with hard and inexplicable experiences, from the cradle up, as Jacob wrestled with the angel. How unlike the face of a sleek beech tree in the sheltered woods!

After all, that is a perverse way apple trees have. They seem to grow crooked under the happiest conditions. James Buckham.

Vermont.

NEW CHRYSANTHEMUMS.

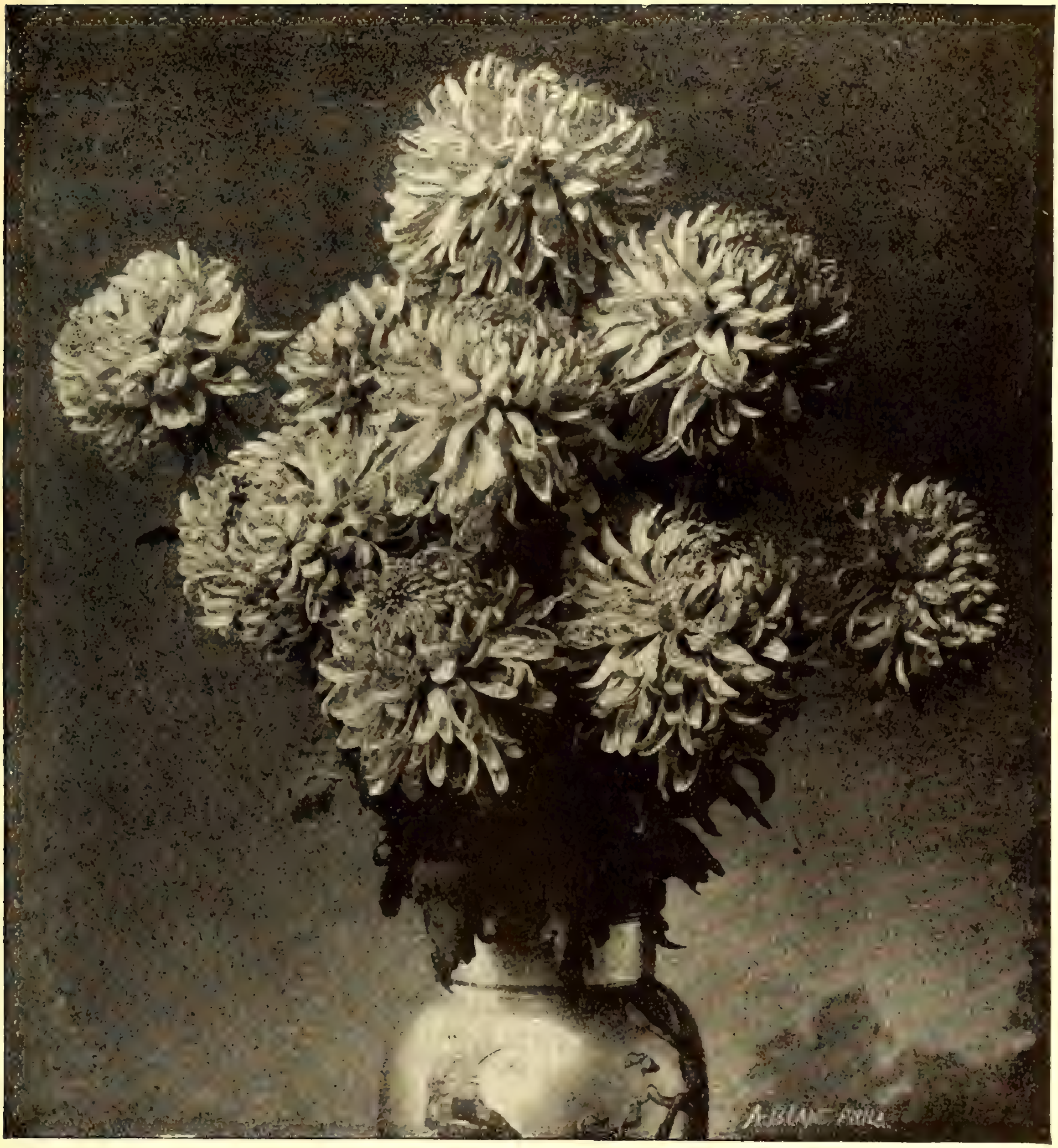
Out of nearly one thousand varieties to be found in cultivation, it would be strange if there were not some kinds that it would be difficult to improve in any way. There are many of the older sorts which it would seem impossible to displace, as they hold their positions each year in spite of the hundreds of new comers. Yet there are more and better new kinds this year than ever before. It is of these and the new ones of last year that we wish to present a list.

That American grown seedlings are far surpassing European kinds cannot be gainsaid. That is to say, the American raised seedlings give more satisfaction, as a rule, in America than do the varieties produced in Europe.

Of last year's American seedlings, the following are really first-class: Beauty of Castlewood, red and gold; E. H. Fitler, gold and bronze; Coronet, golden orange; Mrs. W. K. Harris, pure gold; Colossal, white and pink; Excellent, rose pink and lilac; Advance, lovely shade of rosy lilac; Miss Anna Hartshorn, pure white; Violet Rose, carmine, shaded rosy purple, superb; Llewellyn, red and gold; Mrs. Wm. Barr, plum purple, new color, fine; Mrs. Judge Benedict, white anemone; Mrs. M. J. Thomas, white; Mrs. Irving Clarke, pink; Thos. C. Price, Mermet pink; Mary Wheeler, silvery blush; Sunnyside, white; Mrs. A. Carnegie, crimson; Zillah, bronze and cherry red; Mrs. A. C. Burpee, chrome bronze.

Of Japanese importations, first is Mrs. Alpheus Hardy, with her chaste and distinct character; Kioto, golden yellow; Lilian B. Bird, silvery blush; Mrs. Fottler, rosy pink; Neesima, gold; W. H. Lincoln, glorious yellow. Other Japanese importations by way of Europe are: H. Cannell, yellow; Ed. Molyneux, crimson and gold. Lady Lawrence, Mrs. Dunnett, and Mrs. H. Cannell are identical with Robert Bottomley, Mrs. J. N. Gerard and Christmas Eve, which we have had for the last four years.

Of the English raised kinds, Sunflower, rich yellow; Avalanche, white; Mrs. F. Jameson, bronze salmon; Mrs. John Wright, white; Stanstead, white; Carew Underwood, red and bronze, are all



Ada Spaulding ; First Prize Chrysanthemum of 1889

good. Among the continental seedlings, out of 140 kinds of the past two years, the following are worthy: Mme. Mezard, purple, spotted white. Mme. Camille Richard, salmon rose ; M. Ed. André, bronze ; M. C. A. Carriere, white, perfect shape, very large ; Shasta, pure white with narrow incurving petals ; Ramona, golden yellow, same type as above ; Bohemia, mahogany red, reflexed, solid flower ; John Lane, silvery pink, large and good ; Crown Prince, bronze and gold ; Mrs. J. K. Emlen, crimson and bronze ; Pæony, purple red with strap-like petals ; Mistletoe, silvery blush and purple crimson, incurved and very distinct ; Emily Dorner, bronze with whorled petals, large ; Emily Rieman, soft pink, shaded white, fair size ; Mrs. W. H. Trotter, a peculiar flower, part incurved and part reflexed, pink and silver ; El Dorado, intense gold color, incurved ; Adirondack, white, reflexed, fine ; Lady Selkirk, pearly white, incurved ; Mrs. DeWitt Smith, blush pink and silver, large and fine ; *Zeno-*

bia, very large, reflexed and whorled white; Elliott F. Shepard, paper yellow; London Humphrey, pink, large, distinct; Mrs. Ley, white, like Domination, with pink shadings; Lemonade, bright lemon, early; Cypiere, rose and white; Mme. Ed. Rey, currant red; Perle Poitevine, white; Exposition de Triomphe de Marsielles, buff; Comte de Monstic, red; M. H. Payne, flame red; M. Bernard, amaranth; M. Paukouski, anemone, bronze; Sabine, anemone, lemon and white; Nelson, amaranth, anemone; Veil d' Or, gold; M. Garnar, gold; Mad. Baco, rose pink; Claude Sahut, blush, tubular; Alcyon, solid rose pink; Mme. L. Leroy, pure white.

Here are 20 American seedlings, 8 Japanese importations, 6 English varieties and 19 French kinds —a total of 43, and all meritorious.

Of the new seedlings which have been shown at our exhibitions or have come under my notice, the following promise to be most valuable acquisitions:

Ada Spaulding, a large and fine globe shaped Japanese of sturdy habit, silvery white and blush rose, beautiful; Grove P. Rawson, buff and apricot, new color, very fine: Henry Elkins Widener, clear golden yellow, excellent; Mrs. Thos. A. Edison, incurved, pink, silvery, reflexed, distinct; Cyclone, an immense white flower of a new shape; E. G. Hill, rich chrome and bronze, flowers of fine shape, reflexed and full; Rosebank Gem, large flower, pink and white, distinct shape; Peculiarity, a variety with tube petals, distinct pouch-like, notched and toothed at the extremities; Oriole, golden yellow with twisted petals. Here are 29 new candidates, and as I have said, they all promise to be of the highest merit. It must be borne in mind that I have not seen all seedlings this year and there may be some even better than any here named. I have passed over at least 300 varieties in making the above selection. Before closing this box, there is room to mention the new imported Louis Boehmer, a pink Mrs. Hardy; it will be a valuable acquisition. In the same collection is Omar, a reflexed flower having petals of a deep blood color and $\frac{3}{4}$ of an inch wide. The sports from the Chinese varieties, Mrs. S. Coleman, Violet Tomlin and Miss M. A. Haggis will find many admirers.

John Thorpe.

OUR BACK YARD.

A SMALL LAY SERMON.

WE HAVE societies for the furtherance of many ends which we consider desirable, and we have societies for the prevention of most things we consider undesirable. In fact, it seems impossible in this age for any two men to wish for the same state of affairs without uniting themselves into an association in the hope of bringing it about. Why not then have a Society for the Improvement of Our Back Yards?

The necessity for such a combination all must admit who are familiar with city life. Walk through some streets lined with comfortable, even pretentious, houses, and you will find all *in front* neat and clean, with every possible adornment of windows and grass-plots; growing palms, perhaps, on each side of the doorway of one house, flowers in the windows of another.

Yet is all this but a blind, a whitening of the sepulchre, a putting of the best foot foremost beyond all proper limits. Enter one of these same houses and take a view from an upper back window and what is there in the outlook to please the eye or cheer the mind? A dreary, brick-bounded waste, sub-divided into smaller deserts by hideous board fences (inventions of the father of all ugliness in one of his most dyspeptic moods!), diversified by ash-barrels, trash-heaps and many other melancholy objects, and ornamented by a variety of tin cans and sardine boxes in all stages of oxidation, broken crockery and debris of every description. Here and there, perhaps, a stunted tree, or even a rose-bush, struggles into sight, as nature's feeble protest against the all-prevading ugliness, yet only serving to accentuate it, like a very small light in a very large darkness.

Even the houses themselves from this view partake of the general air of neglect. While the bricklayer's or the mason's art is exhausted in adorning so much of them as is visible from the street, the "alley façade," if I may be allowed the term, is slighted alike by architect, builder and tenant. If the design is to be skimped, and thought and drawing saved, it is here that the loss falls; if bad bricks or slovenly workmanship are to be put in to make the contract "pay," here is where it may safely be done. If shades, curtains or blinds must be economized, the householder—striving only for effect—thinks that the back windows will never be noticed. So all things conspire to render the region of back yards as ugly and depressing a landscape as could well be devised.

Fit tenant and presiding genius of this gloomy scene, the gaunt and hungry "alley cat" stalks from yard to yard over the wooden highways so kindly provided for his use, with an air of dark cynicism which such surroundings could not fail to engender, like an incarnate agent of that power which delights in all ugliness, material and spiritual. To him alone is the region congenial; to the lover of "sweetness and light" it is saddening in the extreme. Tell me, ye whose lot Fate has cast in our populous cities, has not the picture at least an air of verisimilitude? Is it not familiar?

Here is a field for mission work where each may labor *in propria persona*, and not by hireling proxies as in Ashantee and Timbuctoo. This land of darkness lies at your own doors, where each may judge of the need and of the means of reformation. If beauty be a means of grace (and who can doubt it?), then it must follow that the converse is true, and that to live with such an outlook from our windows tends lower and bruteward.

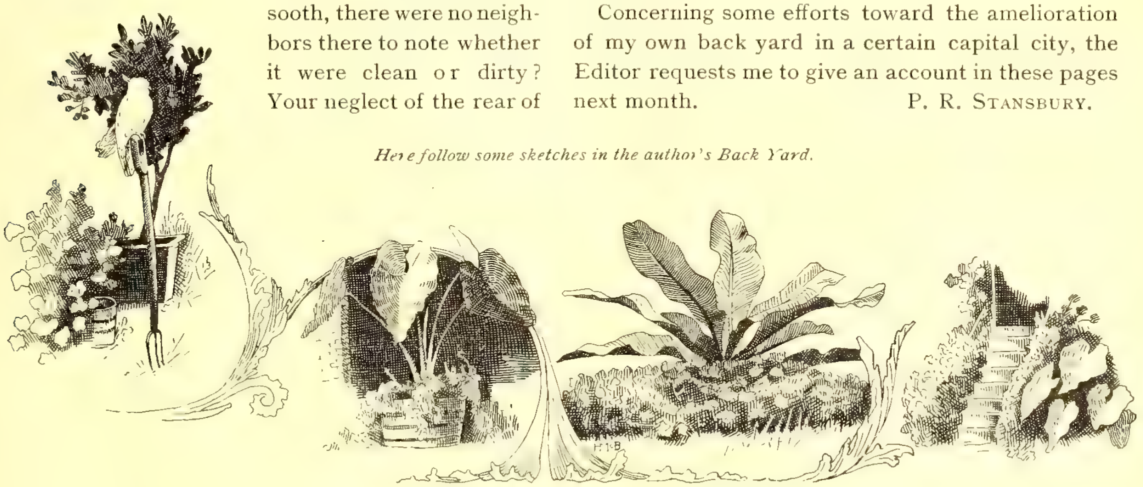
Yet it is not only because of its effect *on* our characters, but as an indication *of* our characters, that such a state of affairs is deplorable. Why do we beautify and adorn our houses and our persons? Because we love beauty and cleanliness for itself, or to impress others with our wealth or our good taste? If you, Mr. Dirty-back-yard, were to be cast away, like Robinson Crusoe, on a desert island, would you cease washing your face because, forsooth, there were no neighbors there to note whether it were clean or dirty? Your neglect of the rear of your premises, which are so carefully cared for in front, is defensible on no other ground.

What is to be done to make so unfavorable a wilderness to blossom as the rose? I admit and am conscious of the difficulties and limitations of the situation. Society has not yet reached that millennial state wherein communism in back yards will be a feasibility, so that the board fence, or some substitute therefore, must abide with us to vex our eyes. The rich, perhaps, may replace it with brick walls, which lend themselves more readily to the beautifying efforts of the amateur gardener, but to the moderately circumstanced and to the "decently poor," the only hope is in disguise.

Again, lines full of flopping clothes of varied hues are not only blots upon the fairest landscapes, but the heroic foot of Bridget the Hibernian, or Dido the Ethiop, is unfavorable to the development of tender vegetation. These flies are in the amber and must be suffered to remain. We must not expect complete success, but only qualified failure. But a dollar or two (not necessarily more), expended in hardy roses, vines or shrubs, added to a little intelligent labor—without which money is always useless—will suffice to convert your 20x50 feet of dreary, cat-haunted waste into the same extent of blooming cheerful garden; to smother your unbearable board fences under a wealth of climbing roses, clematis, honeysuckle or what you will, to the great improvement of your own health and spirits, your better standing as a man and a citizen, and, as one garden infects a whole block, setting an example which your neighbors will be quick to follow, as every real missionary, whether he be lay or clerical, is bound in honor to do.

Concerning some efforts toward the amelioration of my own back yard in a certain capital city, the Editor requests me to give an account in these pages next month.

P. R. STANSBURY.



Here follow some sketches in the author's Back Yard.

THE BLOOMLESS APPLE.

In the last July issue of THE AMERICAN GARDEN I illustrated and described the flowers of the so-called bloomless apple. It was found that the flowers are destitute of colored petals, those organs being reduced to green sepal-like bodies. The stamens are wanting and the pistils are usually fifteen. In the August issue Mr. Fuller supplemented the history of this remarkable monstrosity. An opportunity now presents itself to make a complete characterization of the fruit. The fruits were obtained from Mr. Robinette, of Flag Pond, Virginia, who also contributed the flowers described last summer. The apple is much the size and shape of the Rambo. Its ground color is yellowish green, over which are irregular and dull streaks of red. The apex of the apple presents a singular cavity which extends nearly or quite half way through the fruit. Every alternate segment of the floral envelopes or "calyx," is thickened and somewhat enlarged. These thickened portions belong to the interior series of the envelope, and are therefore petals. The remaining segments differ little from the "calyx" divisions in ordinary apples. Figure 1 affords an admirable illustration of the general appearance of the fruit.

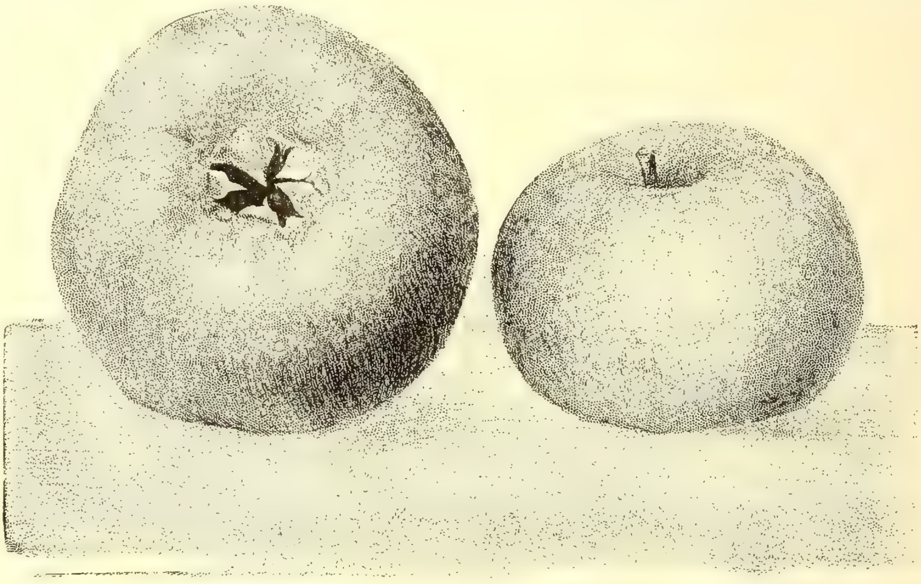


FIG. 1. BLOOMLESS APPLE OF 1889.

When the apple is cut into halves—one of which is represented in figure 2—it is found to possess a double core, one core standing above the other. One or both of these cores may bear seeds. When the seeds are born in the upper core alone, we have the condition which Mr. Robinette described in my contribution last summer: "These seeds were not in the ordinary place, but were near the skin, at the blossom end." The only reason why this apple should not contain seeds lies in the fact that the flowers have no stamens, and there can therefore be no pollination by the same variety. But pollen from other varieties may fertilize it and cause it to set seeds in abundance. With the growth of the apple, the cores, or some of them, split open and cause the hollowness of the fruit. *b* and *c* in figure 2 designate the persistent points of the core-walls, and *a* marks a thickened petal in the "calyx." These points of the walls of the cores are the bodies of which Mr. Van Deman refers in the communication which follows this: "There seemed to be two or three sets of sepals, one above the other, instead of the normal five." The morphology of the double core indicates that the cells assume this position because of the crowding consequent upon their abnormal number. In the flower the superimposed character of the cells is scarcely evident. In the flower the cells are usually fifteen, but when the fruit has matured, some of the cells are nearly or quite obliterated by the crowding.

The first record of this peculiar apple in American literature, so far as I have determined, is that cited by Mr. Fuller in the August number of this journal. This is a record of the Farmers' Club of the American Institute, in 1868.

"L. Barrett, of Smiksburg, Penn., communicated to the club that he had found a coreless and seedless apple the year previous, in West Virginia. He said that the fruit 'was solid and of good flavor,' and stated further, 'they do not blossom like other fruit, but put forth stems and buds like a clove.'" In 1870, the club again had the same or a similar fruit from H. L. Reade, which came from Jesse S. Eby, of Norwich, Conn. These specimens "came originally from his [Eby's] father's farm, in Litchfield county, and from a tree that has had no perceptible blossom, and yet has borne for over 50 years."

In Tilton's Journal of Horticulture for 1869, page 333, Robert Manning describes the "No-core": "We remember seeing, some years ago, at an exhibition of the Massachusetts Horticultural Society an apple called 'No-core' which, singularly enough, had two cores. We had also another apple, received from Messrs. Baumann, the French nurserymen, the 'Hillars Grande.' which showed the same extraordinary formation. * * * The flower of the Hillars Grande was destitute of petals, or showed only what were supposed to be bracts in their place. * * * The fruit was of a yellow color, with dull reddish-brown cheek, pearmain-shaped, tapering, with quite concave lines, and showing the fine carpels very plainly in prominent knobs at the apex. [These knobs were probably the thickened petals.] It was sweet and rather dry, and of little value except as a curiosity." Mr. Manning writes me that "specimens of such an apple were exhibited before the Massachusetts Horticultural Society on the 13th of October last under the name of 'No-blow.'"

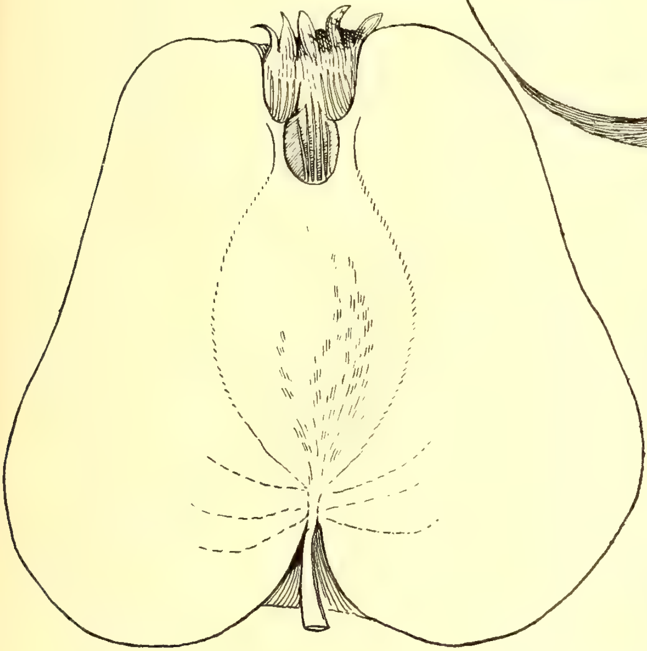


FIG. 3. THE FIG-APPLE, "BLOOMLESS," OF 1768.

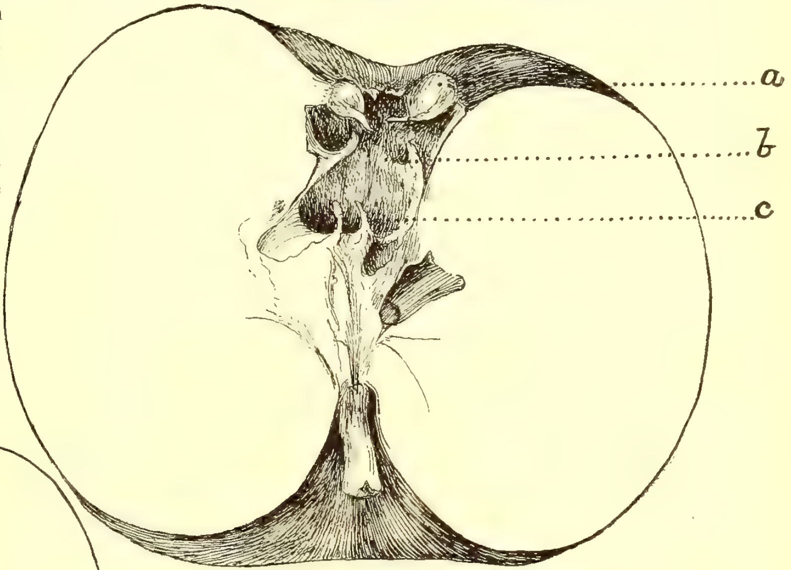


FIG. 2. SECTION OF BLOOMLESS APPLE.

The Botanical Gazette for June, 1887, records the following: "Professor W. W. Bailey [Providence, R. I.] writes that a lady pupil had brought him a spray of an apple tree with peculiar monstrous flowers. The petals were aborted and green, and there were no stamens. The carpels, with style and stigma, were fairly well developed. The tree is reported to bear fruit from these curious flowers."

The first reference to this form of variation which I have been able to find in European literature is in Duhamel's *Arbes Fruitiers*, 1768. The Latin characterization records the fact that the flowers had no petals and that the cells were in two series: "Malus apetala, fructu oblongo, loculos seminum duplici serie digestos foventi, calice prolifero coronato." The "New Duhamel," published in 1807 by Poiteau and Turpin, contains a full description and a colored plate of this apple, which is called *Pome-Figu*, or "Fig-apple." The fruits are long, with concave sides, and greenish-yellow. A cross section of a fruit is reproduced in figure 3. The figures of the flowers are almost exactly those of my former article in AMERICAN GAR-

DEN, and the botanical characters are evidently the same. I translate a few extracts: "They [the flowers] have no petals, but are composed of an ovary with fifteen cells disposed in two tiers, five in the lower tier and ten in the upper, each cell containing two ovules. The calyx is double, of which the five outer divisions are lanceolate, sharp and spreading, and the five inner ones are smaller and alternate with the outer ones. The styles are fifteen, of which five are borne in the center, corresponding to the lower cells and the others to the upper cells. The five styles in the center are joined at the base, and form a separate parcel; the others are equally distributed upon the circumferance and form a circle about the first. We have found no trace of petals [one row of the 'calyx' answers to petals, however], neither of stamens. This singular flower appears to approach the proliferous flowers of botanists."

The structure of all these apples is essentially the same, but the fruit of the fig-apple is very different from that which I have described above. The apple is certainly not necessarily seedless, neither is it coreless nor flowerless. Yet, in a popular sense, it may be called a bloomless apple. It appears to possess no value aside from its curiosity. L. H. BAILEY.

[Note from the United States Pomologist.]

There having been much said in the public press within the last year or two about a so-called bloomless, seedless and coreless apple, which has been introduced to public notice by G. W. Robinette, of Flag Pond, Virginia, I have, after repeated trials, succeeded in getting specimens of the fruit this fall. Mr. Robinette sent me four specimens, and they have both core and seeds. Each specimen had a very large cavity beneath the calyx, which in every case was about one-half of an inch deep and nearly that wide. This aperture was surrounded by a number of rather rudimentary sepals, at the base of which were little swellings that in nearly every case contained seeds. There seemed to be two or three sets of sepals, one above the other, instead of the normal five. From what Prof. Bailey showed the readers of THE AMERICAN GARDEN last July in regard to the peculiar flowers of this variety, it is evident that it is not bloomless by any means, although the petals were wanting. The ripe fruit proves conclusively that it is not only neither seedless nor coreless, but that it has two or more cores and seeds in abundance.

The quality of the apple is tolerably good, but in size it is small, and in color it is of a dull greenish yellow with dull or faint splashes of red. My opinion is that the variety is practically worthless so far, as a fruit, but is quite interesting as a curiosity. Any one who plants the trees of this variety will be disappointed, except in having their curiosity satisfied. H. E. VANDEMAN.

Washington. D. C., November, 1889.

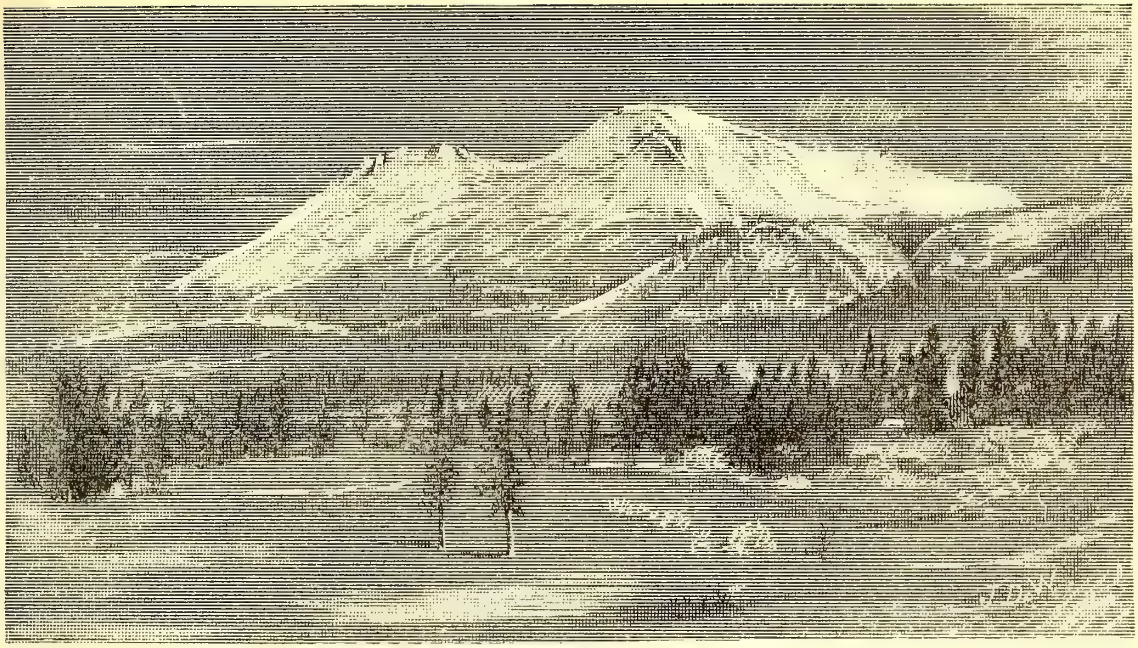
HORTICULTURE IN THE PUBLIC SCHOOLS.

A LITTLE "FAIRY TALE."

A pathetic story credited to the Charleston *News and Courier* is going the rounds about a shoemaker who willed to his brother an ornamental flower box or pot. The box was filled with shoe pegs, shoemaker's awls, "et cetera." He had not curiosity enough to look into the matter, but carefully lifted the flower pot, with its "et cetera," into an old chest. Some years later he lifted it out and gave it, the shoe pegs, awls, and "et cetera," and all to his little girl for a plaything. He died. The widow put in a geranium and it grew in the pot all one summer in the cemetery near Charleston, over the dead man's grave. In fall the geranium and soil were turned out and again the pot became a child's plaything. She smashed it, when lo and behold! they had never noted that the wooden flower pot had a false bottom, and that there were besides some half dollars, one hundred and thirty-five dollars in nice crisp bank notes that had been concealed therein!

That reporter should have been a gardener. If the water could get through the false bottom the bank notes would have soon moulded and rotted. If not a drop could get through, the geranium would not have grown at all. No one could grow a geranium in a pot with the hole utterly covered up. A pond lily might grow in a pot of water but a geranium would not.

They talk of teaching horticulture in the public schools; and yet millions of intelligent people will gulp that story down as gently as a sucking babe, with delightful confidence in its verity! We might have horticulture taught; but where are the teachers? THOMAS MEEHAN.



THE FORESTS AND MEADOWS OF MT. SHASTA.

"Enter this wild wood, and view the haunts of nature——."

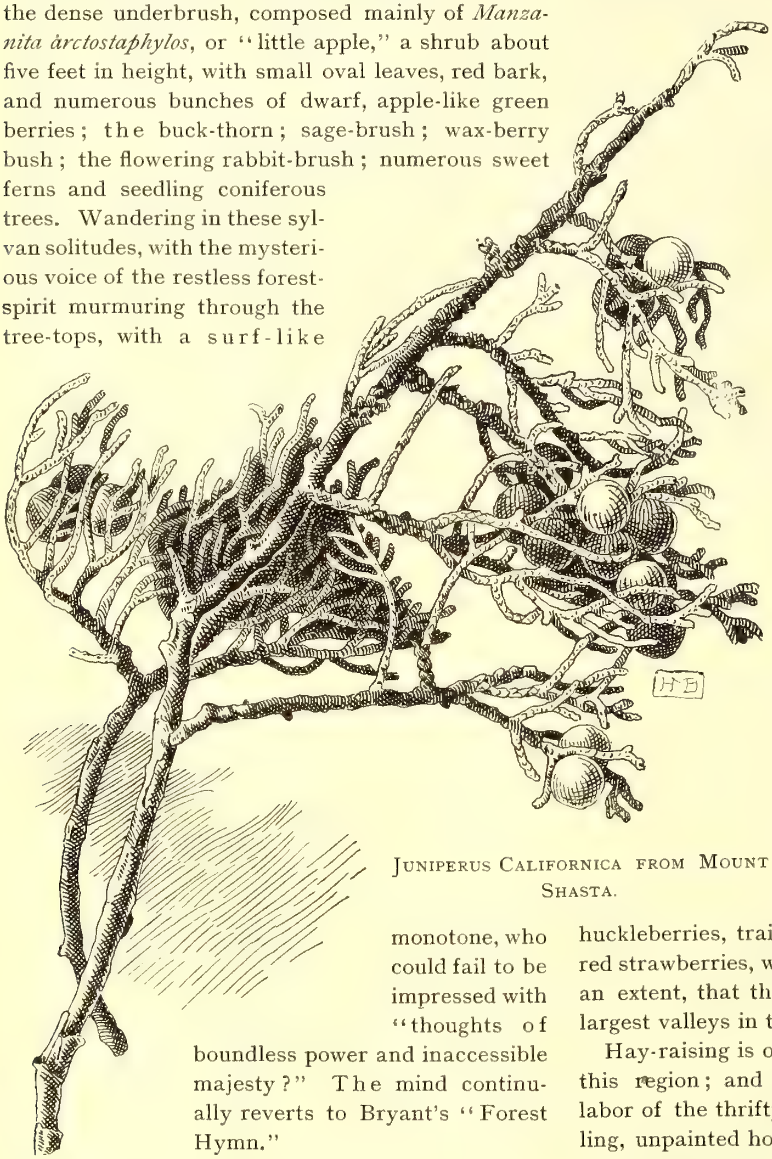
At the northern boundary of the Sierra Nevadas, Mount Shasta, the peak of eternal snows, looks proudly down from its elevation of 14,440 feet above the sea level. Vast armies of noble forest-trees rally at its base, or clamber up its volcanic slopes, to the limit of perpetual snow, as though in defense of their hoary-headed monarch. Mile after mile they stretch away in all their primeval grandeur, clothing valleys and sunny uplands, fringing long ranges of purple mountains, and finding their limit only where they meet the alkali plains, covered with juniper and sage-bush; or where the leveling axe has thinned their ranks to give place to broad, fertile farms and picturesque villages; or to feed the relentless iron horse, which shrieks and whistles through echoing cañons and romantic gorges, where the Indian once held undisputed sway, and the bear and the deer roamed free and unmolested.

Loftiest of the woodland sentinels is the towering sugar pine (*P. Lambertiana*), tallest of its tribe, its average height being over 200 feet. The foliage is of a delicate character, and the cones are often more than a foot in length. Its trunk exudes a sweet yellowish gum, which granulates on reaching the outside air, forming a deposit of sugar, slightly resinous to the taste. Groves of hardy yellow-pines abound on every side, symmetrical, graceful, straight as masts, the haunt of the clamorous blue-jay and the fleet-footed squirrel; the store-house of the provident and artistic woodpecker. Both trees furnish valuable timber for building purposes. Among other species are the swamp-pine, a tree of medium height, flourishing in marshy situations, the cembra-pine (*P. flexilis albicaulis?*), a stunted tree with a white trunk, found near the summit of the mountain; and Fremont's nut-pine, the cones of which yield large nuts, much prized as food by the Digger Indians.

Beside these are also the odorous junipers, the red, black and silver firs, and mighty cedars, hung with mistletoe, stretching their gaunt, gnarled limbs in air, as though weary with the weight of years; the hemlock-spruce, the cypress, groups of evergreen oaks, wind-swept scrub-oaks, the black and the white oaks.

Here are decayed trees, mantled with Spanish moss; others bent and mis-shapen with the burden of December snows or blasted from crest to root by shafts of lightning. Here, again the fire fiend has been at work, destroying in a few hours the growth of centuries, leaving charred stumps, smouldering logs, withered boughs, ashes, and blackened ruins in its wake.

Prostrate upon the springing aromatic floor, bestrewn with patches of "squaw's-carpet," a tough, tenacious little vine, with tiny, serrated leaves, lie giant trunks, four or five feet in diamater, half buried in pine-cones, with bare dry roots and splitting bark, their hollow interiors affording cosy lodgings for the saucy chipmunks, racing fearlessly along their rugged highways. Through a network of shifting boughs, the checkered sunlight falls upon the dense underbrush, composed mainly of *Manzanita arctostaphylos*, or "little apple," a shrub about five feet in height, with small oval leaves, red bark, and numerous bunches of dwarf, apple-like green berries; the buck-thorn; sage-brush; wax-berry bush; the flowering rabbit-brush; numerous sweet ferns and seedling coniferous trees. Wandering in these sylvan solitudes, with the mysterious voice of the restless forest-spirit murmuring through the tree-tops, with a surf-like monotone, who could fail to be impressed with "thoughts of boundless power and inaccessible majesty?" The mind continually reverts to Bryant's "Forest Hymn."



Juniperus Californica from Mount Shasta.

"Father, thy hand hath reared these venerable columns;
Thou didst weave this verdant roof,
Thou didst look down upon this naked earth,
And, forthwith, rose all these fair ranks of trees.
They, in thy sun, budded; and shook their green leaves in thy breeze,
And shot toward Heaven."

On the banks of the wildly beautiful Sacramento and McCloud rivers, and on the margins of clear, pebble-bottomed creeks, whose sources are in the huge glaciers, high up on the side of the mountain, flourish in lavish profusion, the California maple, the alder, the birch, laurel, hazlenut, chestnut, brook-willow, wild lilac, dog-wood, and the thorn bush, white with flowers in the springtime, but laden, in the autumn, with black, mealy berries. The woolly clematis festoons itself impartially from tree to tree; and the long untrained boughs of the sweet-briar wave gently in the summer breeze. The saxifrage dips its broad, bright leaves in the river's sparkling tide, with hosts of velvety bulrushes; while half-submerged logs and boulders furnish a foothold to dainty lichens, delicate ferns and mosses. In this neighborhood, too, we find the pennyroyal, the bergamot, and the sweet herb, or "*yerba buena*;" the wild forget-me-not, musk, geranium, coleus and bignonia; the American holly; wild grape-vines, and the blue violet perfuming the air with its sweetness.

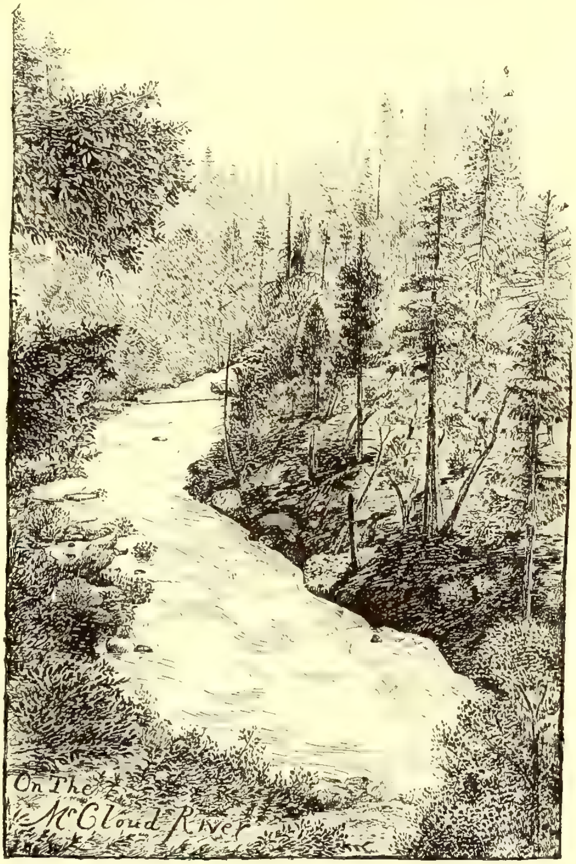
Among native fruits are the elder, with its drooping clusters of azure berries; the long currant-like bunches of the puckering "choke-cherry;" volunteer orchards of bushy, wild-plum trees, bearing a small and not unpleasantly bitter fruit; the bristling spines of the wild gooseberry, thimbleberries, huckleberries, trailing blackberry vines, and little red strawberries, which cover the ground to so great an extent, that they give their name to one of the largest valleys in the surrounding country.

Hay-raising is one of the principal industries of this region; and amply does nature reward the labor of the thrifty farmers dwelling in the rambling, unpainted houses, smothered in luxuriant hop vines, and shaded by such trees as the Balm of Gilead, the cottonwood and the lofty silver-poplar flashing its leaves in the sunshine. One may stand waist-deep in rolling billows of blossoming red-clover, timothy and red-top; or refresh the eye by gazing over long stretches of emerald alfalfa. Truly "the harvest is plentiful." The great barns seem fairly bursting with their fragrant storage, flanked by immense hay-stacks, in the adjoining fields. So fertile is the soil that in the space of eleven years, one pound of red-clover seed planted itself over an area of sixty acres. The assistance of irrigation is obtained by means of ditches dug from the creeks or springs, and the water is turned on in any direction, or off again, at pleasure, by dams and flood-gates. This artificial method is imperative, there being little or no rain before November, with the exception of occasional squalls in July or August.

Orchard fruits are unsurpassed in size and quality as well as quantity, one orchard in Scott's Valley boasting no less than 5,000 apple trees.

The pride of the meadows is the "Shasta lily," a stately, wild tiger-lily, in two varieties; a smaller in shades of orange and black and a larger in black and white, either fitted to grace the finest of city greenhouses. Scarcely less brilliant is a flame-colored plume locally known as the Indian's paint-brush.

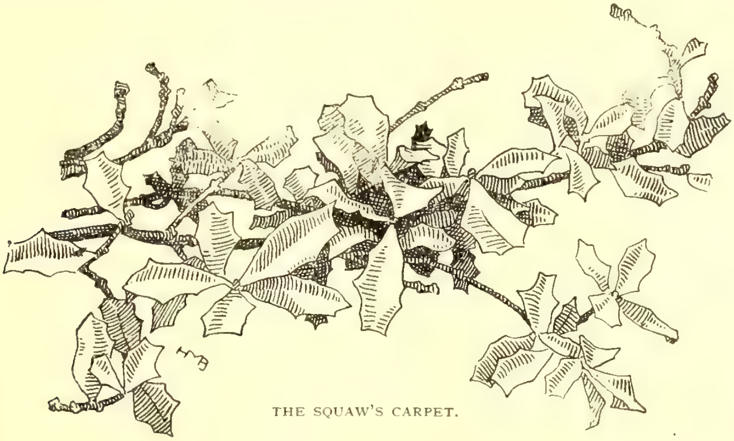
Through a wealth of flowering grasses and nodding gypsophyllums appear the tall stalks of the evening primrose; or the delicate umbelliferous blossoms of the wild carrot, while cardinal flowers, asters, blue-bells, eschscholtzias, columbine, larkspur wintergreen and dandelions run riot everywhere. Over the old rustic worm-fence the wild-rye nods gaily to clumps of shining golden-rod, which guard the country road-side in company with the stiff, flannelly mullein, and the milk-weed, with its silken, winged seeds, so marvelously packed away in their unpretentious pods.



Sublime as are the forests, what can compare with the beauty of the sunny, open meadows, musical with bird-song, flecked by shadows from passing clouds, dotted with thousands of wild-flowers; the paradise of the hunter of four-leaved clovers, the playground of myriads of bees and gay colored butterflies, the nesting place of the meadow-lark and the field-mouse, the refuge of the timorous quail, and the hab. itat of the cricket and grasshopper; and over all blowing the exhilarating mountain wind, bearing messages from the crimson snow plant, on the frozen highlands, and laden with the balsam of the forest.

> "As if from Heaven's wide open gates did flow,
> Health and refreshment on the world below."

BERTHA F. HERRICK.



THE SQUAW'S CARPET.

TARRYTOWN LETTERS—III.

CUTTING TREES TO SETTLE A THANKSGIVING SUPPER—SOME RANK HERESY ON BUDDING AND GRAFTING—MRS. TARRYER AS POMONA—A NEW METHOD WITH TREE AGENTS—A PARSON'S GRAFTING.

COME, BOYS!" said Mrs. Tarryer, after Thanksgiving supper, "get your tools, and let's see if we can't find two or three shrubby trees fit to dig for planting in the nursery, around the bushy trunks of the wild apple tree we have been eating the fruit of with so much satisfaction. Let's have one more thing to be thankful for—apple-trees on their own roots. Go get your tools and I will go with you; a walk will settle my supper."

Presently five tall young men, surrounding their leader, turned down the corner into the meadow towards a certain hedge-row, where a young seedling tree has distinguished itself by filling three barrels with fair apples this wormy season. Every one who has tasted them wanted more.

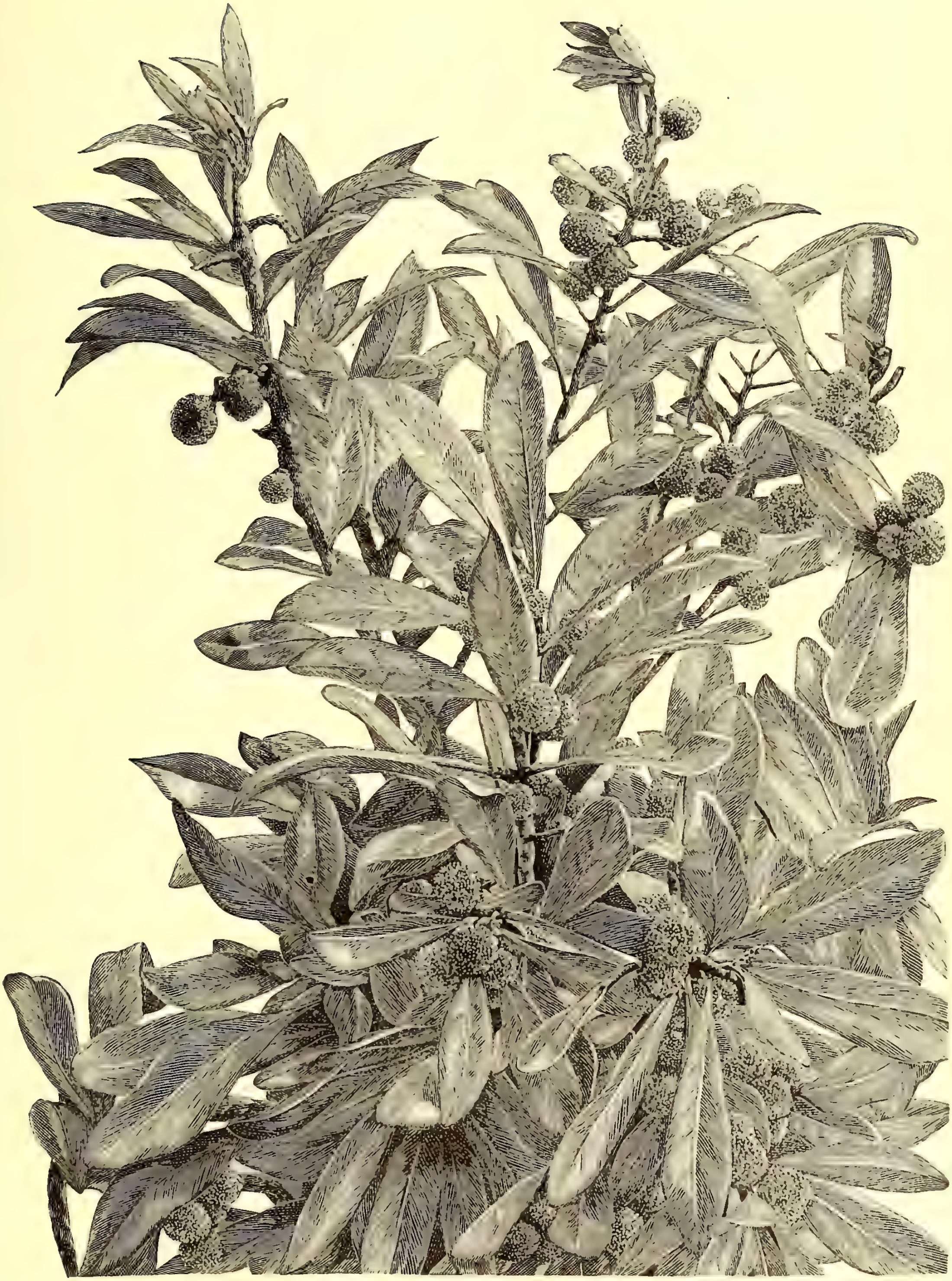
She despises budding and grafting above ground, and so did her ancestors before her. She says those artificial tricks would never have been practiced, at the rate we have run them by wholesale, except during the darkest ages of American gardening, when nothing was sacred from light-fingered manipulations. One of her griefs in going to the neighbors, is that she finds no such piquant variety of fruit as the old orchards were full of, but the same formal trade trash, all alike distasteful, from house to house, and never anything racy of our own soil. And while she knows we might do better, it vexes her to see the places of honor and profit at our little country parties given to figs, bananas, oranges and grapes—all imported.

"Too far from the original root," is her remark about the tough-skinned fruit she sees in market, "You can use scions one or two removes from the native tree without much loss of quality, but after that degradation is rapid. And what frightens me" she says, "is to see people growing up and taking charge of our affairs without the sense of taste to notice whither our progress is tending."

By a long correspondence concerning a barrel of extra red, tender, white-fleshed, juicy and spicy Baldwins from Michigan, she proved they were propagated within a cut or two of the original Massachusetts tree and had rooted from the scion. She repeated these investigations in several other quarters—with an industry worthy of a director of small experiment station, and with similar results! At one of our winter-meetings she exhibited a bushel of indubitable Baldwins, yellow as Bellflowers; ditto of green ones, each sort respectively selected from two lots at our grocers. Both were bitter, tough and corky, with the worst characteristics of the Baldwin predominant. She stood by her show for hours and talked—giving away the two bushels of degraded specimens and also a couple of bushels more of superb reds from a certain local orchard whose honeyed juice sticks to the fingers so that guests need a chance to wash after eating them. These last she knows were grafted from near the parent stock. Very few people understand that all our good apples were once natural fruit seedlings.

Likewise the R. I. Greening—that heartiest and most satisfactory of after-dinner apples, under the waist-band—has been shockingly maltreated by its manufacturers. You should see Mrs. Tarryer, in the courage of her convictions, explaining the Greening decadence to a dubious fruit committee at an agricultural fair; with the toe of her little boot slightly projecting from her trim fitting gown of black stuff, and one of those bogus Greenings balanced on the tips of her thumb and fingers, where everybody can see it. "That is the kind of apples we grow to sell—not to eat, gentlemen. It has what we call "good *handling* qualities"—giving it a little bound on the table between the plates and catching it again to prove it. "The old *flat* Greening, when you find it, will be all green till it begins to ripen and then it will grow yellow with the maturing sugar. It should always be *tart*, however, and never what you call mellow, but *melting*.

"We produce this kind of apple to *ship*, gentlemen. We can ship it to New York, and from there we can ship it to Hartford, Springfield and Boston, looking for big fools enough to buy it. On many



Fruiting Branch of Myrica rubra, a New Japanese Fruit; One-Third Natural Size (in diameter).

hotel tables it is used to check consumption. The servants won't eat it. English cities are depending on us for cider apples, but they don't want rubber Greenings or corky Baldwins even for that purpose."

Mrs. Tarryer was once *Pomona* of a Grange, and she set her brother nurserymen of the Order in a good deal of a flutter for their craft by describing in open meeting how apple-trees are manufactured now by wholesale: "There may be blocks of fifty or a hundred thousand trees or more ready for market in the ground any October. These are cut under the roots by horse-power, pulled up and laid in trenches handy for the drive of spring trade and packing. Then the ground where they stood is plowed and every bit of a root as big as my little finger, or a pipe-stem, is gathered and stowed away for making what are called 'root-grafts,' at $2 to $4 a thousand, packed in barrels. Prunings of the next year's sale-stocks are cut as wanted for scions, and skilled hands are kept busy all winter in warm quarters grafting these bits of roots. So anybody who can plant onions and cabbage-stumps for greens in spring can be a nurseryman. It may, and probably does happen, by this system, that our oldest varieties of fruit have been beheaded and stuck upon alien roots as many as fifty times over. The wonder is, brethren and sisters, that any characteristic virtue of a variety should remain after this treatment. True to name apples may be, but in practice the orchardist finds, that by the mingling of divers nursery-stocks—transported and exchanged in every direction—that we are never sure of receiving two trees bearing fruit exactly alike, even of the inferior qualities, or roots that agree with the subsoils of any section. As new crops of dupes spring up hither and yon, this ignorant and nefarious trade continues, and many orchards are planted after this fashion, but rarely a single one that is good for anything."

Tree-agents have a great respect for Mrs. Tarryer. When a good-looking youngster comes along, who appears as though he was a beginner, I have known her to invite him into the sitting-room and treat him with as much distinction and kindness as if she had six or seven marriageable daughters. He never gets a chance to draw his pictures on her. It is *her* books, correspondence and pictures he is kept busy with till dinner-time, so that he forgets all about his trade. After dinner she'll have him out in the garden, in the season of it, and show him her own nursery and fruit and floral treasures, and if the youngster evinces any particular sensibility to treatment—interest in the real-life sciences, etc., she sometimes gives him a small sum of money, if she finds he needs it, to buy the books she recommends to him.

One such young man she rather fell in love with and induced to stay over night with us. When she had taken leave of him at the foot of the lane next morning, she came back glowing like a middle-aged angel, saying, "I *do* really *think*, Alonzo, *that* lad will go into some *better* business. He *says* he shall. His father and mother *need* him at home and he says he's going back there to *plant a garden*. He's engaged to a *lovely* young girl and she *wants* him. Isn't it *dreadful* to imagine a young fellow like that, *lending* himself to the scattering of weed-pests, peach-yellows, and all the insects and fungous plagues one can think of—*diseases* for aught we know—along with good-for-nothing fruit-trees, which people only buy out of *pity* or to *get rid* of him!"

She remembers when her father paid $4 for two accursed cling-stone peach-trees, which blasted all the orchards in the neighborhood with the yellows, while her mother was selling or giving away the most beautiful seedling trees, true to name, for twenty-five cents a dozen—she furnishing a spade for the digging. These varieties had been proven, locally, by the strictest pomological judges the world ever saw.

Except, perhaps, for drumming the parents of thieving children into fruit-planting, and making the taste for some fruit common in crude markets, among people that never had any before, Mrs. Tarryer insists that nurserymen to date have been a detriment to the country. "Had people been let alone they would surely have served themselves far better."

While I am writing she hands me a *London Garden* for August 10th of the current year, with a page on the "Evils of Grafting." The editor seems up to his neck in a controversy that must have been going on for a long time. He's sharp for the right, and has learned that grafted rhododendrons are growled at in this country. Seeds of European common-sense sown by valiant Eugene Baumann the elder, and others, have taken root here. He maintained, stoutly, that only seeds of our own *R. Catawbiense* should be used. The London editor knows, and has named, in a previous number, some English nurseryman who propogate rhododendrons by layers, and grows many other things upon their own roots, that have been habitually and needlessly crippled by grafting or budding. "When we planted an orchard some years ago"—(says the English editor, and God bless him!)—"we could not get a Ribston Pippin on its own roots anywhere, and everyone we spoke to about it was ready to laugh at the wish as ridiculous." Now, it would appear, the English public is served by better naturalists, though sophisticated trade is still moved much thereby.

Mrs. Tarryer is always solid with her authorities. She refers me to a scrap in Vol. III, p. 437 of Downing's *Horticulturist*, showing that engrafting at best, is but a temporary gardener's expedient—not fit for the base of wholesome business. In 1843, or afterwards, Signor Calderini, of Milan, budded *Panicum crus-galli* (farm grass) with rice. He *saved seed* from the onion and *sowed* it, and thought he got a larger kernel and more vigorous growth from the progeny among the fungi of Lombard marshes. The experiment helps prove that even engrafted things may bear seed of their kinds.

The way she treats case-hardened and roguish tree-agents makes me almost pity them. They never get inside of the house. She meets them at the door with a broom, and if a cool manner does not send them off the premises, she warms it for them. One flagrant case must be related. If the nursery trade only knew what is said of it, how its ears would burn!

Parson Camperdown, long since retired from pulpit business, used to be our beloved minister, and many a theological confab Mrs. Tarryer has had with him. She never could abide his use of "grafting," in illustrating the change of heart a Christian experiences in turning from wrong to right courses. She deemed the crafty simile unworthy of the serious subject. But the parson persisted, and when he quit preaching and came back to his farm, he grafted everything he had, almost—raised hob with his mossy old orchard—(long since dead and uprooted), and they say Mrs. Tarryer asked him if he didn't mean to "graft" a new switch in place of the rather bald and mulish tail his Dobbin carried. He was continually bringing over samples of his "improved" fruit, which Mrs. Tarryer never could see any special merit in, and finally the old gentleman (partly to please the lady, no doubt), set up for an amateur strawberry-grower, "without a particle of taste, or the least eye for color or form," as Mrs. Tarryer remarked at the time.

Not long after she had turned from the door a particularly smooth villain of a tree-agent (whom she declared she had seen at some Peter Funk auction near the steamboat dock), the parson presented himself at our door smiling all over, saying 500 plants of "Dr. Nicaise" strawberries he had ordered had come that day, and would Mrs. Tarryer accept a hundred of them?

This was too much. "O Mr. Camperdown!"—she cried—"You are a bigger fool in pomology than you ever were in theology! You have paid twenty-five dollars of good money to that rascally tree-agent who was here the other day! I wouldn't have trusted his face for a minute—a born thief if ever there was one! All the strawberry plants he sold around here he dug from Widow Aleshine's old bed of Prolifics! Why didn't you ask me about 'Dr. Nicaise' It won't grow. It died out of my garden more than two years ago. I don't believe there are 500 plants in the world!"

By this time she had Mr. Camperdown inside in an arm-chair and was telling him she *must* make an example of him for that piece of business. And she did. The old gentleman's money never baited any more tree-rogues in our neighborhood. But she maintained more positively than ever that mistakes in theology were not as harmless as some people think, because they all seem to crop out in all the details of common life.

The decrepit young orchards scattered about the country embitter Mrs. Tarryer against the ravages of wholesale nurserymen. "Those dying trees wouldn't be there breeding vermin, if people with more money than sense hadn't been tempted and badgered into buying short-lived trees they didn't want or know how to care for. And the worst of it is that every bit of good native fruit we have is whisked off by resident simpletons to go the road of the Baldwin and Greening. By these means local pride and ambition is destroyed—made impossible without a rebellion—instead of being nourished at home, everywhere, as it should be. The very people on whose farms and in whose gardens new seedling fruits of great public value originate,—having no taste or standards of their own—never know what they have got till trees come back to them with the mark of the grafting 'beast' upon them."

These sayings of Mrs. Tarryer's will mislead concerning a very mild and sweet tempered woman, unless it is understood that they are condensed from an ordinary life-time. She feels that the culture and propagation of the apple by right methods is a matter of the very first national importance, intimately connected with the welfare and character of our people.

"Now," said she, when five tall sons and a daughter—besides a table-full of relatives and friends had sampled that delicious wild-apple sauce—"do you take your tools and go to that tree and dig carefully at the shrubby base of it, and I think you can divide off two or three small bushes, which, nicely trimmed and heeled-in over winter will do to set in the nursery next spring, and will make fine trees, to the manor born. That is a valuable apple. Three barrels at the first bearing is a large product, and in a season when apples are very wormy these were not touched by insects at all. The Baldwin itself was once precisely such a come-by-chance tree. By turning up roots for adventitious buds, or by cuttings, suckers, layers or seeds, were the radical old ways of the garden for propagating fruits, and if this doctrine, commonly accepted, can be made to give the grafting nursery-trade a wholesome check—so much the better. Fruit-growers *must have roots* that they know, as well as *soils* and *manures* that they know. Go, boys, and I'll go with you."

METHODS OF MARKETING—II.

MORE ABOUT PACKAGES—HOW FRUIT AND VEGETABLES ARE SHIPPED—GOOD AND BAD PACKAGES.

CRATES are by all means the most popular packages in the New York markets and with near-by shippers. They are easily handled, and produce can be packed in them closely and in such a manner that it will not bruise. From the time they are first used for strawberries, blackberries and raspberries, till the close of the season, all sorts of fruits and vegetables are packed in crates. For shipments of vegetables and orchard fruits a cheap crate is constructed which answers the purpose nicely. It is simply made of cheap rough material, the ends being made solid and slats nailed on at distances apart suitable to the fruit they contain.

Plums are frequently packed loosely in these cheap crates, and in such cases, of course, the slats are placed closer together. By the use of his strawberry and raspberry crates for other fruits the grower is able to save considerable expense for packages. The 32-quart strawberry crate shown in figure one is but one of a dozen different makes. The difference in construction lies almost wholly in their strength and the variation in prices. A cheap strawberry crate can be manufactured and sold complete for 75 cents, but they will not stand much hard usage. It is a good plan when using these cheap crates to go over them with a few nails, strengthening the corners, and fastening clasp and hinges more firmly. These are, as a rule, the weak parts.

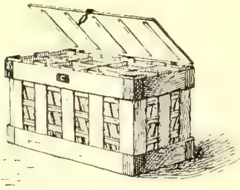


FIG. 1.

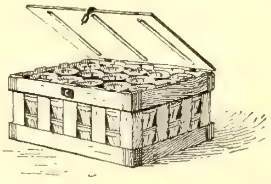


FIG. 2.

All fruits which sell by the quart, blackberries, cranberries and Seckel pears are shipped and sold in the standard 32-quart strawberry crate.

The 45 or 60-pint basket raspberry crate, figure 2, is probably more applicable to all purposes than the strawberry crate. It will hold 8 to 12 ten-pound baskets of grapes, which can be better handled in this manner than separately. A cheaply constructed crate of the size and capacity of a 45-pint raspberry crate is, in many cases, cheaper to handle.

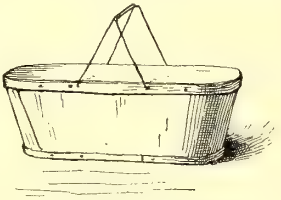


FIG. 4. A good scheme.

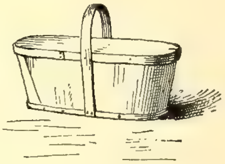


FIG. 3.

Fancy peaches are put up in pony baskets and crated as shown in our previous paper. Pears are also put up in the same manner. Of course this method of packing is expensive on account of the increased cost of transportation, but the price secured by the fancy and attractive packing, as well as by their superior condition on arrival is usually sufficient to more than equalize things.

As stated in our first article, it would be almost impossible to describe the many different packages in which produce is brought into the New York markets. Grapes seem to receive the best treatment both in regard to uniformity of packages and the manner of packing. The grape basket is usually made in two sizes, one holding 5 pounds, the other 10 pounds. The manner of construction is similar in all cases, the top of the basket being a solid piece of light wood, fastened at either end with a wire or piece of tin, as the case may be.

It is interesting to note in this connection how sharply the commercial world are learning to look after the waste. Some of these grape baskets have the cover fastened to the basket by a strip of tin which is tacked to the cover and bent over so that the end catches at the under side of the hoop which goes around the top of the basket. This makes a fastening at once secure, yet one that may be easily loosened when necessary. It is easy to see that these fastenings are made from waste pieces of tin, so small that they cannot be well used by the manufacturer who makes the waste, yet they come into play in this connection to great advantage.

The illustration, figure 3, shows the style of grape basket now in almost universal use for native grapes shipped to the New York market. While we will treat more fully the question of marking packages, it is plain to see that grape growers and packers are more progressive in this respect than others, and we will touch on the subject just here for a moment. In a thorough search of the markets of New York we failed to find a single basket of first class grapes but what had the name of the variety marked plainly on the basket. By far the larger portion were not only so marked, but in addition bore the grower's name and address in a conspicuous position.

This is encouraging, showing as it does a disposition to advance with the rest of the world. Of course it will be understood that to the force of competition is largely due this reform, for it forces the grower to raise, pack and ship a superior quality of produce in order that his name may be a guarantee of value. It may be considered a general principle in the fruit business that the grower who takes pains to mark the packages with his name and address, does so believing that his packages contain a superior article with which he desires the consumer to become familiar.

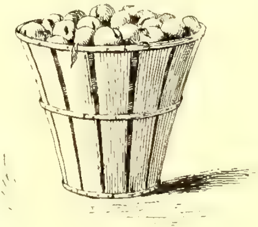
The question of packages is an important one, yet so wide in its scope and so dependent on the grower and shipper more than as anyone else, that it is impossible to much more than generalize on the subject. Still, the necessity of reform is most important.

Said a prominent New York commission man to the writer: "A United States law determining the size of packages for different fruits would be a blessing to dealers and consumers. A dealer at present is compelled to buy a package and weigh or measure the contents before he can judge at what price he should sell them."

"Once peaches were all sent to market in a basket holding $\frac{5}{8}$ of a bushel; now they come in all sorts of packages from a barrel to a grape basket.

"The strawberry producer has succeeded in maintaining an honest quart, pint and third, but the 'side-walk venders' buy a basket holding about $\frac{2}{3}$ of a quart and retail from this, giving the purchaser the basket rather than running the chances of letting him see how few berries he has received for the money.

"There has been a change for the better in the grape packages. The shipper in the interior of the state makes use of 5 and 10-pound baskets, which go with the fruit. Growers in the counties along the Hudson river use a package called the 'gift crate.' This is a light skeleton case containing 8 small baskets in two tiers. The baskets are sold with the fruit and only the weight of the case deducted."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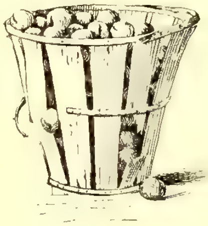

LOSS.

The case last mentioned is patterned after the California grape case described and illustrated last month. We have mentioned the majority of the "standard" packages used in the New York markets. Other fruits not referred to are usually sent in the same packages as those already described. For example, choice currants come in quart strawberry baskets. Inferior fruit, being used more for preserving, is shipped in any box or crate which is returnable; this last grade of fruit is sold by the pound.

Cherries are sent in 10-lb. grape baskets. Choice plums are marketed in quart baskets and 5-lb. grape baskets; the inferior kinds in kegs and half-barrels. Cranberries are received in quarts, grape baskets, bushel boxes and barrels. Gooseberries are usually marketed in quart berry boxes.

Vegetables come in all kinds of shapes. We see potatoes in barrels, boxes, baskets and bags; peas in the same sort of packages; onions generally in crates; beets, carrots, turnips and other root crops in boxes and barrels. Naturally, large quantities of vegetables are brought to the markets of New York on wagons, and in such cases they are usually transferred to the most convenient package at the command of the dealer.

As a matter of course, in such a market as New York, receiving shipments from so many different people in different localities, there is more or less of bad packing in poor packages. Dealers who are familiar with all sorts of packing claim that they have great difficulty inducing growers to use proper packages. A small, tight box, which is most frequently used for a dozen quart baskets of fancy berries, is sometimes filled with pears or other orchard fruits; the box contains no given quantity and both dealer and customer guess at the quantity. This of course frequently loses a sale.

Bad packages means both packages that are not suited for the produce and also those which are in bad shape, broken or worn out. Our illustration shows a good package and a poor one; no comment is necessary—it shows for itself. For the originals of these sketches we have but to go through Washington Market in New York at any time.

As an illustration of packing fruit in unsuitable packages, we recently saw a large crate of pears delivered at the store of a commission man. As the crate was taken from the wagon, the odor and feathers which enveloped it led us to suppose it held live poultry as it had evidently been used for that purpose before. When the covers were removed all bystanders were surprised to find that the box contained pears. To say that the commission merchant was disgusted hardly expresses the feeling. To save the fruit he had each specimen carefully wiped with a cloth and, after being well aired, repacked in proper baskets; by this means they brought a good price. Yet such is the stubbornness of the human family, that the chances were nine against one of any reform by the grower.

The merchant will explain by letter what he was obliged to do in order to sell the fruit. The grower will read the letter, wink an eye and slyly remark. "Oh, that's all right; he is trying to make me think he is serving me extra well." Along goes another box in the same shape, and, should it so happen that for any cause the merchant could not dispose of them as he did the first lot, up goes the wail from the grower, of fraud, cheat, roguery, etc.

It has been made most evident to the writer, who by the way has grown and shipped many crates, baskets, barrels, etc., of fruit to the New York markets, that if the average grower would pay more attention to suggestions made by his commission merchant he would realize far better returns than at present.

[TO BE CONTINUED.]

CANNING AND PRESERVING.

MORE INSTANCES OF THE IMPORTANCE OF SUPERIOR PRODUCTS—EVAPORATING AND ITS ADVANTAGES TO THE PRODUCER—SOME SUGGESTIONS WORTHY OF CONSIDERATION.

Third Paper.

OF PROGRESS in this nineteenth century there is no end. Progress marks every movement, and though tillers of the soil have in the past been charged with having less of the spirit of "push" than any other class of people, it is interesting to note that they are becoming less deserving of this unenviable, though perhaps deserved, distinction as the years go by.

The world has every reason to believe that the horticulturist of to-day is as far ahead of his brother of 25 years ago, as the latter was in advance of the primitive workers of old colonial days. This evolution has not been sudden, but was a slow process, weighed well and considered long before being adopted.

Competition had a hand in the struggle, and to this powerful enemy (?) of production and friend (?) of consumption more than one land worker owes his salvation in his chosen work. It has opened the eyes of our horticulturists to the absolute necessity for energetic, progressive moves should they wish to hold their own with other workers in the field.

The deeper we go into the question of canning and preserving as one means of consuming the produce of orchard and garden, the more apparent seems the necessity for a stronger combination between the two branches. Each has an opportunity to better his condition by educating the public, or that portion of them who are consumers of these products, to a desire for better goods of the same kinds. This does not seem to us an impossible undertaking; we have but to base our reasoning on the events of the past to give color to the position we now take. In any community the best is usually the cheapest in the end for the consumer; this will be granted without argument. Again, in the strong tide of competition, is it not the business operator who places the best goods on the market at a fair price that soon towers above his competitors? This needs no argument. Our correspondents among the canners and preservers seem to understand this thoroughly, for scarcely without exception, in reply to our question, "Would the production of a superior quality of fruits and vegetables enable you to pay a price sufficiently in advance of the present one to warrant the grower in making the effort?" they have emphasized their affirmative reply.

As an additional support to the position taken in favor of the production of better fruits and vegetables, we may say that the commercial standing of the establishments with whom we have corresponded and whose prices to the producer were highest, rank better than some of the others. This may be chance to some extent, but when we look further into the matter and find that the goods these people put on the market are of superior quality, is it not reasonable to presume that at least some portion of their financial standing is due to the quality of their goods?

Canning, preserving and evaporating requires capital, suitable location, and a knowledge of the work, to successfully carry on the business. A "plant" which is complete and of such a nature that it can capably handle the products brought to it, no matter what quantities within reason, must of necessity be large and expensive.

Take for example the canning factory of E. C. Hazard & Co., of which we made mention in our first paper; the average number of people employed at this establishment is from 160 to 175, and, from what was given us as the average wages of a young woman of 18, we should judge that $8 a week per person was a fair average of the price paid for labor. Then there are the various pieces of machinery, many of them imported and, from their peculiar construction, expensive. To these large items we may add the thousand and one smaller expenses. In this connection it must also be remembered that having contracted for the products from a stated area, these manufacturers are bound to abide by their side of the contract, provided the other party thereto carries out his agreement.

These facts are but to show that the business requires capital in no mean proportion, and that considering the expenses they are under the price paid the producer is a fair one; and yet, as has been noted, almost without exception these men are willing to pay a higher price for a better article.

Under these circumstances we feel warranted in holding to the opinion expressed, that under ordinary conditions, with the average market on the one hand, and the canner, preserver or evaporator on the other, the chances for profit to the grower are greater by growing for these establishments than in taking the risks of the ordinary markets.

One of our correspondents writes that contracts are frequently made which allow the grower to dispose of the first of his crops at the regular markets while the prices are higher than the contract price with the manufacturer. We do not know whether this may be called a concession on the part of the canner; it may be that at the proper time for taking the earlier crops his establishment cannot handle them, or, circumstances may be such that in order to make any arrangement with the producer he must make the stipulation noted above.

It is interesting to note the replies given by various correspondents to questions 4 and 5:

4. What advantages, if any, accrue to the grower by reason of the location of your establishment in his vicinity?

5. Does he appreciate these advantages?

Here are a few of the replies:

4. They enable him to find a ready market at home for a quality of fruit that used to go to the cider mill for a few cents, but now brings a paying price.

5. No.

4. They save transportation charges, commissions and do away with the damage to crate, etc.

5. Some do.

4. Short haul and sure markets for all grades.

5. No.

4. Convenience of a new market and the consequent saving of transportation charges.

5. Yes.

4. 25 to 50 per cent. increase in the net profit to the grower.

5. Doubtful.

4. They have the benefit of the varied experiences of the canner, keep better posted, take more horticultural and agricultural papers and are a more live set of men than in other districts.

5. As a rule they do not.

It is well to explain that these correspondents are from different sections of the country; some of them are located with their buildings in regions remote from good markets, and therefore the advantages to the grower are greater than in other localities.

This subject has been treated in detail so far as it is connected with the manufacturers; we have tried to handle the question impartially. In a future paper, we propose to continue this subject, taking the grower's side of the question. We invite the readers who are interested in the subject in any way, and especially if their experience does not coincide with what has already been written, to send us a brief letter of facts in this connection.

[TO BE CONTINUED.]

A LITTLE PLACE IN THE COUNTRY.

WATER AS A SUBSTITUTE FOR TIME AND FERTILIZERS—GETTING A HELPER—WHAT TO PLANT—CONVERTING OUR LABOR INTO MONEY.

Sixth Paper.

THE MAXIMUM of pleasure and profit is to be obtained from the possession of our country home, only when it has been brought to the highest state of fertility, and consequent productiveness. It will take time, and the acquirement of a practical knowledge of the methods of practical men, to accomplish this result.

In the meantime we must look about for the best substitute for these that we can find, to the end that we may keep the lawn green, have an unfailing variety of fine vegetables for the table, and that our strawberries may not become mere clusters of unpalatable seeds from an untimely drought, just as they should be ripening.

The best substitute that we can find for time, experience, and costly fertilizing will be WATER. If we can have plenty of that, and have it under our control, we may hope for success to crown our horticultural efforts, even on lands and in seasons that might otherwise afford but a poor return for our labors. It is true that water is not manure. But as all plants absorb their food only in a soluble form, it is of the highest importance as a medium for carrying the food. And even where soils are deficient in plant food, if water is applied regularly, it will render soluble, and consequently available, such supplies as the soil does hold; and as it is less often the lack of plant food in the soil, than it is the inability of the plant to use such as there is, it will be easily understood that the results from poor soil richly treated may often be greater than from good soil wrongly treated.

The efficacy of water in the work of "making a crop" under unfavorable conditions was illustrated in my own case this summer. The overflow from a hydrant watered every day a poor ridge, which was crossed by some rows of cabbage, and by some cucumber hills. The cabbage headed much larger and earlier there than in other parts of the rows, and the cucumbers gave more fruit, and of course withstood a drought (which came in mid-season) much better.

There can be nothing more annoying to the amateur, or more productive of loss to the professional gardener, than to have the labor and hope of the early summer wrecked by a drought coming, as it so often does, just as we are about to reap the reward of our patient care. No one, until he has engaged in the making of a garden, can realize the poignant anxiety with which the forecastings of the weather prophet may be read, nor how anxiously the heavens may be scanned for a sign of rain.

The only feasible way, under ordinary circumstances, of providing an adequate water supply, will be by putting in a wind pump, and connecting it with a system of tanks, pipes and hose. Where there are facilities for irrigation, this is, of course, unnecessary. But while the first cost of the plant will be considerable, it will be vastly better than a dependence upon a corporation water supply—even if that be available—where the recurring annual tax would soon amount to the entire cost of the individual plant.

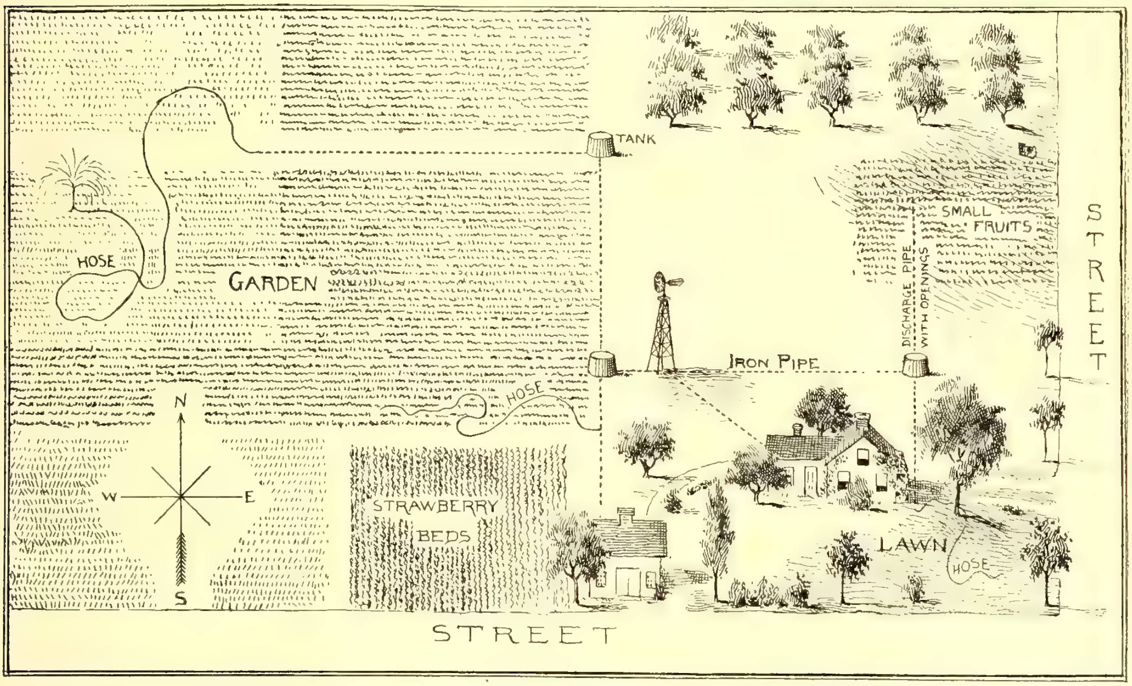
In locating the pump there are other matters to be considered beside that of striking water easily. While that should have due weight, we must also endeavor to locate the pump as centrally as possible so that the various portions of the place may be reached without undue expense. And elevation must be considered, if it is the intention to use the water upon the more elevated portions of the grounds, or if it is intended to supply the upper stories of the dwelling from this source.

The elaborateness of the plant will depend upon the amount of ground that it is desired to cover. Thus if only the stable and a small garden are to be supplied, a single tank by the pump and a coil of hose will suffice. But to get the best use and money return from the outlay, tanks should be built upon various elevations, and kept supplied by means of iron pipes running from the central one.

The method by which the water is distributed to the plants must depend somewhat upon the formation of the ground. If it can be easily gotten to the head of slopes, it may be discharged there and allowed to find its way down by means of small irrigation channels, or it may be distributed by hose, as upon the lawns; or in applying to young plants, where only a limited amount is wanted, it may be done with large sprinkling cans.

The vegetable garden will be the most directly benefitted by the water supply, and after that the strawberry beds. So, especial care should be taken to have tanks so located that these may be easily reached.

We have now progressed far enough, and reached that season of the year, when we must determine upon our plans of work for the spring and summer. That we shall have a garden, and a good garden, is a foregone conclusion. But just what its extent shall be, and whether it shall be solely for supplying our own table, or whether we shall make its scope sufficient to afford a surplus for sale, may be yet an open question. In suggesting the location which was outlined in the first of these papers, the idea was not only to select a place where the first outlay will not be large, but where the subsequent income from our labors might reimburse us, in part at least, for our expense in maintaining a country home.



To have a good garden, such an one as will be satisfactory throughout the season, and competent to meet all demands upon it, even for the home table, from lettuce to late celery, will entail no small amount of labor and expense. I do not mean an amount that the product will not repay—for a good garden does always pay. But so long as the care, the labor and the expense must attend the venture, if we are to get anything worth having, it will be wise to increase the quantity of each of these somewhat, and endeavor to get a money product that will leave as clear profit whatever we may use in home consumption.

To do this will require the services of a good vegetable gardener as a helper, and here it will not pay to be "penny wise and pound foolish." A good gardener, one who can use his eye and his brain, is worth incomparably more, especially to the beginner, than the man who can only hoe and dig; a knowledge of the "short cut" in planting and in cultivating, and in preparing vegetables for market, may save more than the difference in wages. While the more proficient a man is, the more wholesome pride will he have in his occupation, the greater desire to prove his value. But for the price which it will be wise to limit ourselves to, this first season of superintending, we must not expect too much. Do not look for an experienced fruit grower, a competent florist, and half a dozen other things in connection. If he is a good gardener, that must suffice.

Having found such an one, and become satisfied as to his habits of industry and sobriety, employ him at once. His services will be needed as early as the first of February in hot-bed work, preparing cold-frames, getting manure and composts ready, etc., and it will be well to make a contract for a term of nine months, as the last of the vegetable work will not be out of the way before the first of November.

A garden two acres in extent, if worked to its fullest capacity, will afford ample opportunity for the complete exercise of one man's powers. A greater mistake cannot be made than to suppose that chances for profit will be enhanced in proportion as his territory is extended. "A little ground, well tilled," is an old song; but it cannot be sung too often while its moral is so universally disregarded.

By a proper succession of crops, keeping the ground occupied the season throughout, the two acres will become five, at least.

The questions of what shall be planted, and when, and why, should all be canvassed and decided, as far as practicable, before the work is begun. Nothing should be left to chance. Our own tastes will be a pretty safe guide. In the early spring we want lettuce, and young onions, and beets, and radishes; and we want them early—the earliest. So we may know that those who buy do likewise. And then we want green peas, and early cabbage, and cauliflower, and beans, and cucumbers. We know about what proportion we want of each (if not, our wives do), and that may guide us in planting.

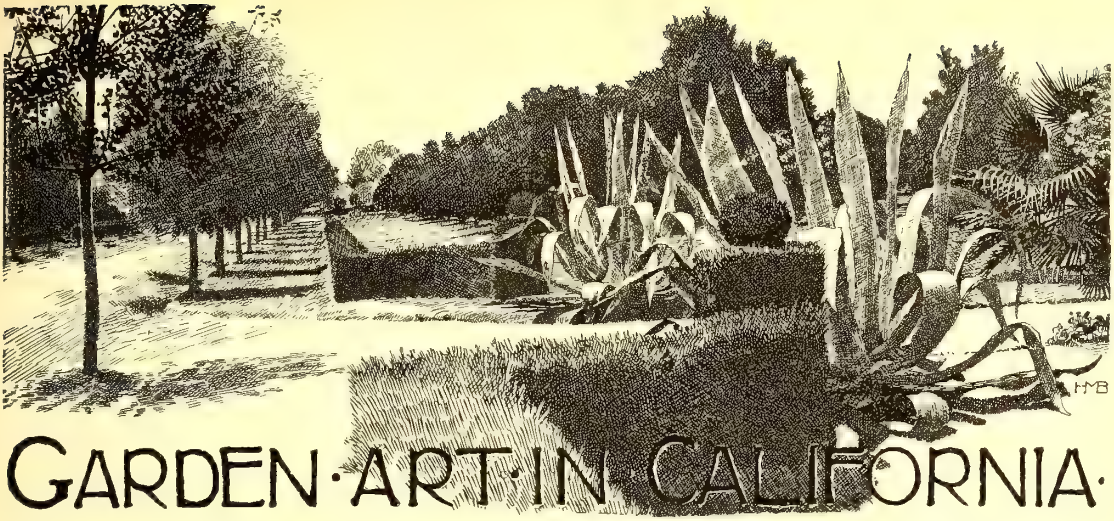
After these, which are mainly for immediate use, come the crops which supply green vegetables for the table and for canning and pickling, as well. Such are late cucumbers and tomatoes. And those which are put away for winter use, such as potatoes, beets, onions, cabbage, turnips, celery, etc. The good garden—that which is directed by "sound mind and a sound body"—will fail in none of these.

Although a crop which is not yet planted is a long way from market, it is not too early now to be considering the method by which the surplus of the garden shall be disposed of. As we are not (at least as yet) professional market gardeners, we will not care either to sell them about town from a wagon, or to take a stall in the city market.

There are as yet comparatively few country or suburban towns in which one cannot find a groceryman who would be glad to arrange for a steady supply of vegetables, grown close by, and sent fresh to his stand every morning. If such an one can be found, who will take the product and sell it on commission, it will be the most satisfactory arrangement that could be had. Failing in this, the the product may be shipped to commission dealers in the city, or it may be sold at home (and better prices obtained) by employing a man or boy for that purpose and giving him a percentage of the sales. The best buyers will always be glad to obtain their supplies direct from the garden of the farmer, rather than from the city, or even from the stand of the local grocer.

Even those who have gardens will be our customers, for the average amateur's garden begins late and ends early. By the time the hot suns of July begin to shine upon the garden, the amateur loses interest and gives up the battle with the weeds. So that just when he should be enjoying the profits of his labor, the garden yields nothing and its owner is compelled to buy from his wiser neighbor whose seed time and harvest have been planned to run through the season.

But to sit by a comfortable fire in this breezy month of January, and plan our garden, or even to walk abroad when spring winds blow, and say, "It shall be thus and thus," is a very different thing from that "four o'clock in the morning" courage that takes us upon the same ground with hoe and spade in hand. To plan is not to do; and success in gardening can only be had by the presence, supervision and personal work of the one who is chiefly interested in the great and mostly definitive question of profit and loss.



GARDEN·ART·IN·CALIFORNIA·

A GLIMPSE OF THE MILLENNIAL AGE, AND A REVIEW OF GARDENING IN THE GOLDEN STATE—THE GARDEN GOLD MINES OF THE FUTURE ON THE PACIFIC COAST.

Horticulture, in its best estate, is one of the factors in the evolution of a noble and refined social order. Not without bitter knowledge of the temptations of cities and politics, the wise Lord of Verulam wrote : "Men come to build stately, sooner than to garden finely, as if gardening were the greater perfection." And so it is, perhaps, a matter of world-wide importance when a garden-loving people begin to develop new features of this ancient art, under peculiarly favorable conditions of soil and climate. The horticulturist has found but one California on the continent. No one, except the individual concerned, cares at all whether or not there is money in this thing ; but every thoughtful person cares greatly whether or not a very Italy for beauty, a land of new and exquisite garden surprises, is being created in the hidden vales, and on the mountain sides of Coast Range and Sierra. It may happen that, a hundred years hence, lessons for the healing of the nations will come from the associated horticultural enterprises now in their infancy on the Pacific Coast. At least, I am sure, the potential garden-art of California works towards higher ends than the pleasure and profit of the gardeners themselves. From homes in such rose-gardens as the world has never yet seen, American colleges may yet gather their best students. In the colony farm-gardens by the hundred and thousand, educated men and women may yet live by intensive horticulture, and slowly infuse higher ideals into the organization of the state. Perhaps the full development of California horticulture will some day take the sceptre of political power from the cities and place it forever in the hands of educated suburban communities, trained in the rights and duties of local self-government.

Twenty years ago the tendency of things in California was to destroy the small farmer, the small fruit-grower, the ten-acre colonist, the gardener, and the garden. Vast empires were being conquered by capitalists, stolen from the Government, seized from the herdsmen and miner, watered by river-like canals, sown to wheat and alfalfa. One heard of plans for orchards of ten thousand acres, vineyards to cover whole valleys. Slowly the high cost of labor here, and all the disintegrating influences that oppose a landed aristocracy, began to destroy the fabric. The profits of the large rancher lessened : the profits of the horticulturist increased : the small homestead set in the midst of a garden is becoming the Californian ideal. For this the whole country, a wilderness of fertile hills, a land like a vaster Palestine, is thoroughly adapted, and can in no other way fulfill its destiny. The value for the present year of the purely horticultural products, fruits, wines, vegetables, flowers, in the state of California, will be, it is estimated, something like thirty-six million dollars. The growth of the cereals is still the greatest industry of California, but horticulture comes next, and in ten years more will undoubtedly outrank all other pursuits.

Mining, manufactures, general farming, commerce, are all to be but the hand-maidens of horticulture in California. Here, then, if the present promise is broadly fulfilled, a commonwealth is to develop differing in vital respects from the other American commonwealths. What a pregnant fact it is that in the single county of Fresno (fifteen years ago a sheep-range county), four thousand eight hundred acres of new orchards and gardens were planted last winter by about five hundred different colonists

In the state at large, about four million trees were planted last winter. Nurserymen tell me, also, that about two hundred and fifty thousand rose-bushes were planted, chiefly in the coast counties. Such large importations of plants from Japan and the Orient were never before made. The enormous commercial demands of horticultural communities begin to display themselves. To plant one hundred thousand acres in trees requires ten million plants, grown at least two years in nurseries ; it requires at least one hundred million vines to plant the same area. And, some day all the best part of California will be devoted to horticulture.

I look out of my window. The sweet pea hedge, sown before Christmas, is eight feet high and six feet wide, a mass of bloom from the ground to the topmost spray, and has been so since May. The rose bushes are loaded with flowers, the pansy bed is in its prime, the nasturtiums, from seed sown in the open ground, are higher than the tops of the cottage windows, and have been blooming since February. Ten-cent rose plants sent me by mail last December, are bearing several flowers apiece, and stand a foot high or more. Down the street I can see a two-story cottage whose front is entirely covered by a rose-vine which has been budded to eight or ten choice varieties ; they are all in bloom now, and have been so for a month. There are large houses here that are covered from basement to roof with Maréchal Niels, La Marques, Banksias, Climbing Devoniensis, Reve d'Or, and other famous roses. In my own little garden, which in September, 1888, was a piece of pasture, with only weeds and grass upon it, I gathered flowers from my Maréchal Niel rose on Thanksgiving Day, and it has been in continuous bloom ever since.

Last summer about twenty rose-fairs, and other horticultural shows, were attractions in various parts of the state. We have not yet come to that stage of the art which demands differentiation of our material. After awhile California will have daffodil shows in February, hyacinth shows in March, and pansy shows in April, as well as rose shows in May ; in fact, we shall have flower shows every month in the year, and ultimately, perhaps, a perpetual flower society exhibition. A successful horticultural magazine and a dozen or more weeklies devoted to branches of horticulture are supported in California.

The gardens which I wish to describe are using in the fullest manner the possibilities of soil and climate here. Perpetual growth and bloom abide in a typical California garden ; the trees and shrubs need very little water, except the natural rainfall ; the spring bulbs and early flowers need no artificial supply. The secrets of gardening here are constant tillage, early planting, and the keeping plants from going to seed too early. The roses, for instance, are cut back after each period of bloom, and then new shoots start at once. Daffodils, and many other spring bulbs become naturalized, and are left in the ground to take care of themselves, just as the wild flowers do. The fortunate tendency of gardening art here is to produce a very extensive naturalization of beautiful plants from all over the world. Eventually, many of these plants will escape from gardens into the fields, ravines, and woods, and gradually add most interesting elements to the Californian landscape. In Ventura, I know of a ravine where the trimmings of rose-bushes have many of them rooted, being carried down by the rains from a garden above, and are now running wild over the bushes. In Nevada county I have seen the most delicate and lovely garden annuals, self-seeding, and permanently established in the forest. In Alameda county it is now proposed by some garden-lovers to sow many pounds of nasturtium seeds in the warmer cañons, there to take care of themselves, as they certainly will.

That delightful book, Robinson's " *Wild Garden*," says, " What it " (the wild garden) " means is best explained by the winter aconite flowering under a group of naked trees in February ; by the snowflake growing abundantly in meadows by the Thames' side ; by the perennial lupin dying with its purple an islet in a Scotch river, and by the Apennine anemone staining an English wood blue before the coming of our bluebells."

The perfect type of the wild garden will be of slow evolution here, because almost the entire world of plants is ours to choose from ; but there can be no true garden art here that does not adopt as far as possible the theory of the wild garden. We can plant Japanese and Bermuda lilies in copses with our own carnelian-hued and white wild lilies ; we can mingle the golden-rod of New England with the perennial glory of our flaming eschscholtzias ; we can have the white tigridias of Mexico wild on our own hills with the butterfly-bloom of the Mariposas ; we can sow seed of the wild flowers of Syria, Palestine, Carniola, Greece, Italy, Spain, Japan, Australia, South Africa, and let them blossom with our native "cream-cups" and nemophilas. All the shrubs, trees, bulbs, vines, herbaceous plants and annuals known to botanists, can find congenial soil and climate somewhere in California. To be more exact, it is *the flora* of the whole northern and southern temparate zones, and of the vast acreage of the hill-ground that lies in furrowed folds about the snow peaks of the world, that the coming wild gardens of California will lay under contribution. We aim to acclimatise the desirable plants for beauty and for use from every source, and to enrich our horticultural art with new results of plant sports and cross-fertilizations.

When the great valleys are divided up into ten and twenty acre farms, each farm with its garden, and when the hill slopes, the richest portion of California for horticultural uses, are all likewise cultivated, the range and variety of growth here will be the greatest known to any region on the continent. On the slopes of Mount Lassen, hardy Russian apples and the most iron-clad American grapes are grown; in Colusa county the date palm bears heavily, and would be a profitable tree to plant extensively. Such is the range of climate. It remains for the future to show whether or not the people of California will utilize and develop these unique horticultural advantages. CHAS. HOWARD SHINN.

JAPANESE FLORAL ART.

IN NO other country is the artistic use of flowers so well understood or the art practiced in such perfection as in Japan. This old art is to become a new one in America and Europe. It is old in Japan, but new to western nations. Only recently has the art been reduced to form and theory. A few months ago, however, Mr. Gordon, an architect in the employ of the Japanese government, who has formulated the principles of the art, expounded the system before an audience of foreigners in Tokio, the capital of Japan. We make some extracts from the London *Times* report of the lecture, which are well worthy the attention of all who love plant life.

In America and Europe floral art consists almost exclusively of the use of the blossoms, which are crowded together in rich masses of color with little attention to individual form and often with total disregard of the lines of stems, branches, and of the character of growth; in Japan, on the contrary, the basis of all flower designs is a series of harmonizing lines in which the stems and branches play the most important part. This instinctive perception of the beauty of harmonious lines is everywhere noticeable in the arts of Japan.

The art of flower arrangement, like all other arts in Japan, has a long history and has its various schools. At first it appears to have been mainly connected with Buddhism; then indigenous schools arose, instructed by some men of more than usual originality and mental vigor. In fact, its history appears to have taken very much the same course as that of the pictorial arts.

The most popular school of the present day is the Enshiu. According to the doctrines of this sect or school, all flower arrangements were built about an imaginary skeleton formed of lines of balanced curves. Symmetry, the most elementary kind of balance in composition, is eschewed, but a more subtile harmony was obtained, far more in conformity with the principles of beauty as discoverable in natural forms. The ordinary flower arrangements are two, three, five or seven-lined, and a somewhat different character is bestowed upon these lines according as they are applied to standing or to hanging arrangements.

Intimately connected with the character of flower compositions is the form of the vessels employed, of which there are several kinds adapted for standing, resting against the wall or a pillar, or suspending. Among these are certain curious vases made of bamboo cylinders, with several side openings intended for the arrangement of flowers in several stages. In these compositions, which contain several kinds of plants or trees in combination, the locality of growth and special character are never lost sight of, a distinction being always preserved between trees, land plants, and water plants.

In selecting and arranging flowers the appropriate season and, in the case of plants common to several seasons, the peculiar character of the particular season, are never lost sight of. Used in combination, some hold higher rank than others, and with different varieties of the same species the colors have a certain order of precedence. White blossoms as a rule rank first, but there are several exceptions to this rule. The idea of sex is applied in several ways to the character of leaves, stems, and blossoms in combination, the leading idea of such distinctions being to produce a pleasing variety and to avoid redundancy. Many curious fancies exist with regard to the selection of trees and plants. Those having poisonous properties in stem, root or flower, and some suggestive of ominous associations, either on account of their names or owing to accidental tradition, came under the ban of ill-luck and are studiously avoided.

A good deal of ceremonial is mixed up with the practice of arranging flowers. Flower gatherings are often held, at which it is usual for the guests to make flower compositions, in which case certain etiquette is to be followed both by visitors and by host. Special occasions, such as weddings, comings of age, house-warmings, welcomings, farewell gatherings, and anniversaries all have appropriate flowers and appropriate methods of designing.

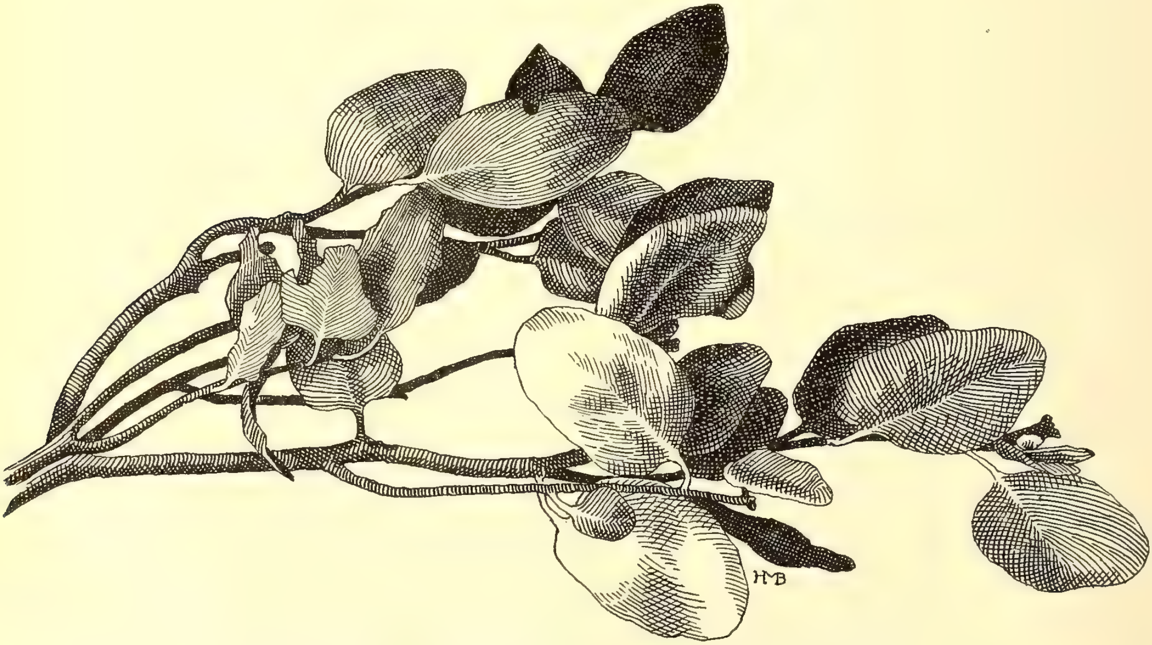
Harmony is required between the flower groups and wall fixtures in front of which they were placed. This relates both to harmony of lines and proportions as well as to harmony of character. One must not clash with the value, motive, or effect of the other, and if possible the combined arrangement of picture and flower group should have a continuity of idea. For example, in the case of a picture representing a water landscape being used, the flowers arranged in front might be irises or other water plants, suggestive of the foreground of the landscape.

Some of the most popular flowers are treated in a variety of ways, at first sight seemingly capricious enough, but actually founded upon a close observance of natural laws. Combined branches of cherry blossom are to have buds in the centre and top, and blossoms at the base and sides, inasmuch as the cherry tree commenced blossoming from the lower side branches. In the same way arrangements of autumn leaves are to be redder near the top, because banks of maple trees become reddened first towards the top of the slope.

After the general arrangements of the composition into harmonious lines, special attention is devoted to the distribution of blossoms, buds and leaves. With large-flowered plants, such as the chrysanthemum and pæony, an over-crowding of blossoms is studiously avoided, and full flowers, buds, and half-opened flowers are distributed with careful regard to variety of form and balance of mass. Certain plants, such as the Chinese orchid, are valued only for their fine oval leaves, and with certain other flowering water plants, like the iris and narcissus, the long blade-shaped leaves receive more attention than the blossoms. The judicious grouping, bending, and turning of these leaves, so as to reveal their different surfaces without redundancy, form an important part of the art.

Fanciful classifications into male and female principles and into imaginary functions, such as dew-dripping leaf, dew-holding leaf, spring leaf and winter leaf, come to the assistance of the designer in producing becoming effects.

Skill in manipulation is only to be acquired by patient practice. The artificial form imparted to branches and stems is obtained by bending, and, in the case of unyielding material, by means of more violent crushing, splitting, and even temporary bandaging. Methods are in use for increasing the vitality of certain branches by means of drugs, fire, and hot water. The two last methods are applied to the extremeties of cut branches to increase their power of suction, and the drugs, consisting of tea, cloves, and spices, were employed as stimulants. The firm fixing of the stem or branches at their base is obtained by means of slit wooden holders placed crosswise in the mouth of the vessel or in a bamboo tube hidden in the vessel. For water plants placed in wide, shallow receptacles, fancy metal fixtures are often employed in such forms as crabs, scissors, horses' bits, and other things common and curious.



Manzanita arctostaphylos of Mount Shasta. (See page 10.)

THE PLANT HOUSES AT KEW.

A PROSPECTIVE VIEW OF NEW YORK'S FUTURE BOTANIC GARDENS (?).

THE ROYAL GARDENS at Kew stand foremost in the world as a horticultural establishment. There is scarcely a corner of the globe where its fame has not reached, as proved by the many donations of plants and seeds, etc., annually received from the remotest colonies. The first account which we have of the gardens dates from about the middle of last century, when the collection was in the charge of Mr. W. Aiton, an accomplished horticulturist; by his great skill in the cultivation of exotic plants he soon attracted the attention of the leading botanists of that period, who worked hand in hand with him to make the Kew collection large and valuable. The number of species in the collection at that time numbered 3,000 to 4,000, contained in one or two conservatories. The number of species gradually increased and the erection of other houses has been going on ever since, till at the present time the plant houses of Kew can boast upwards of 150,000 square feet of glass—truly a magnificent total.

A thorough system is employed in the arrangement of the plants in their various houses, all being kept as nearly as possible under the conditions of their respective countries. For example, in one house we meet with the flora of South America and its surroundings, while in another we find that of Australia, New Zealand and so on, thus enabling students and others to easily recognize the plants they want. A brief description of the notable houses may serve to give the reader an idea of the vast treasures which are carefully stored in this establishment. For the benefit of the numerous visitors who throng the place daily all the houses are numbered off in sections.

Let us commence with No. 1 house, wherein are contained the valuable collection of tropical aroids to the number of 500 distinct species, the plants being well grown and showing a considerable improvement in their condition over that in which they are found in their native homes, due to the fact of them being better sheltered than they would be in their native soils.

In houses 2 and 3 are contained the ferns, tropical and temperate—a collection grand indeed, numbering nearly 2,000 species. Many fine specimens of tropical tree-ferns are represented, showing by their sturdy stems and graceful fronds the care which is exercised in bringing them to perfection. The Kew collection of filmy ferns excels all others, especially so since the late Mr. Cooper Foster (an ardent admirer of this class) bequeathed the whole of his valuable collection to Kew. This section is a particularly tedious one to cultivate well. They revel in abundance of water during summer, but woe betide the grower who allows the strong sun to catch his plants, as that will spoil them almost beyond redemption, thus destroying the work of years.

To be successful in the cultivation of filmy ferns a site for the house intended for their reception should be chosen in a shady position. The house is to be built low and cases fixed round the sides of the house with doors made to slide to and fro as it is necessary to water them daily during warm weather. Practically speaking, in England no heat is required in such a fern house, as in the summer the temperature is sufficiently high to meet the demands of the plants, and in winter the plants rest; yet in very severe or damp weather a little heat is advisable to keep the air on the dry side. Artificial heat, if possible, should be dispensed with, and to do this a covering known as *frigi-domo* is highly recommended as it will keep out many degrees of frost. Where possible, rain water should be used for watering the plants, as the lime, etc., found in wells is injurious and often fatal to the plants.

No. 4 is the house known as the conservatory, always gay and attractive. It holds a thousand or so plants staged to give effect. Noticeable here are the many fine climbers which adorn the roof, the common though highly useful *Lapageria rosea*, *Clianthus puniceus*, *Rhodochiton volubile* and various fuchsias ranging from the common gracilis to that beautiful variety Monarch, which, hanging gracefully from the roof, greatly impresses the onlooker. The camellias may not be passed over without noting many fine specimens of a good ripe age, planted in beds where they thrive in agreeable fashion, each in season bearing large masses of beautiful white or rose colored flowers.

The Kew collection of succulents is contained in house No. 5, and is remarkable for its immensity, having been vastly improved by Mr. W. Watson, who is at the head of the tropical department, and who has written that admirable little book "Cactus Culture for Amateurs." The "rage" for the culture of these plants is fast growing and in a few years we may see the cacti family most popular.

A block of houses, seven in number, form what is known as the T range, from its resemblance to that letter. In this block we have growing a varied group of plants, cape heaths, begonias, stove plants, *Victoria regia* (this takes up a whole house), economic plants and the orchid collection.

The palm house is a magnificent building; in fact, the finest of its kind now standing. It was built from plans drawn out by Decimus Burton and completed in 1848; therefore, it has been standing 41 years. Its entire length is 362 feet, the center is 100 feet wide and 70 feet high, while the wings are 50 feet wide and 30 feet high; this house alone contains 45,000 square feet of glass. The glazing is tinted green, in order to prevent the sun's rays from scorching. The frame work is entirely of iron, fixed at the base into solid blocks of Cornish granite, thereby making it proof against wind and weather. Here are many fine specimens of palms, magnificent examples of the beautiful *Pritchardia pacifica*, which with its gorgeous stem and graceful leaves rears its head high in air; *Sabal palmetto*, *S. Blackburniana*, *Livistona chinensis*, *Seaforthia elegans* (now called *Archontophœnix Cunninghami*). These are all magnificent specimens, nearly touching the roof with their crowns. These will no doubt in time become too large for this building, when they must be destroyed and their places filled with smaller specimens. A large specimen of the screw pine, *Pandanus odoratissimus*, is to be seen in this house; it is 40 feet high and has a girth of about 150 feet. It is a noble plant, and produces cones freely, each so large that a half bushel would scarcely hold it.

The palm house contains many other valuables besides those noted above. A grand display of cycads are to be found in one of the wings. The very large specimens are placed on the floor, while the smaller ones are placed on the stage which goes round the border of the house.

A word about the temperate house. This stands away a considerable distance from the others, and like the preceding one, is very large, but it is built in quite a different manner. The plans for it were also produced by Decimus Burton, and though it has never been finished, it covers three-quarters of an acre of ground; it will, however, in time be completed, when it will cover the enormous space of one acre and two-thirds. The centre portion is 212 feet long and about 140 feet broad, with a height of 60 feet. It is utilized mainly for large specimens of Australian, North American and New Zealand trees and shrubs. Foremost among the notables are a couple of fine specimens of *Araucaria Bidwillii* (The Moreton Bay Pine), each about 50 feet high and having a girth of about 60 feet. Many lofty specimens of *Cyathea medullaris* and *Dicksonia antarctica* help to adorn the body of this house, while the side shelves are staged with smaller specimens of eucalyptuses, acacias, cordylines, etc.

In addition to the houses above mentioned there are many others which, though smaller, are none the less important, as in them are nursed the plants which are received from all parts of the world.

Kew, England. P. WEATHERS.

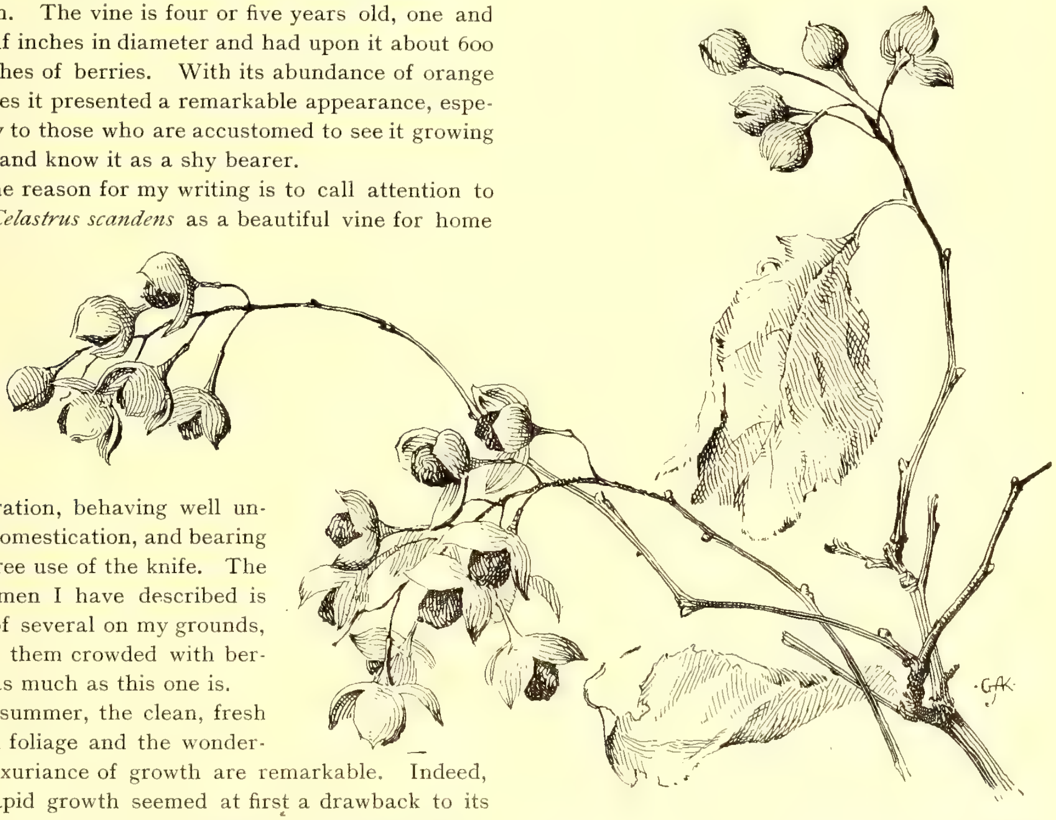
HORSE HELP IN THE GARDEN.

One of the most remarkable things observed in going from one section of the country to another is the different methods in use for doing the same thing. The West can teach the East many ways of economizing labor, especially in the substitution of horse for hand labor in the operation of the farm. The farmer's garden, however, is even more neglected in the West than at the East, and is usually made upon the same plan or omitted altogether. What there is about onions and lettuce and beets that require them to be grown in rows six feet long upon little beds three inches high in a yard with a picket fence around it, is more than I could ever understand. Professional gardeners have long since discovered common sense methods of growing these crops, but the majority of farmers have given the subject little thought and continue to make their gardens or allow their women to make them in the way their fathers did who came from England, where land is dear and men are cheap and time no object. It makes me sick to see a woman wading around among the weeds in a garden patch looking for a mess of something for dinner, while just over the fence is a 40-acre field of corn with not a weed in sight. Why not take away the fence, and let the rows of vegetables continue on from the rows of corn? The garden then will be better cared for. We have tried the English garden long enough; let us have an American garden for American farmers. A. A. CROZIER.

THE CLIMBING STAFF OR BITTER SWEET.

The name, Bitter Sweet, is likely to mislead those somewhat benighted people who know the very different *Solananum dulconum* by the same word-label. The picture of my Bitter Sweet or Climbing Staff (*Celastrus scandens*), on page 31, is of a vine trained upon a cedar pole about eighteen feet in height, and the photograph was taken after all the leaves were fallen. The vine is four or five years old, one and a half inches in diameter and had upon it about 600 bunches of berries. With its abundance of orange berries it presented a remarkable appearance, especially to those who are accustomed to see it growing wild and know it as a shy bearer.

The reason for my writing is to call attention to the *Celastrus scandens* as a beautiful vine for home decoration, behaving well under domestication, and bearing the free use of the knife. The specimen I have described is one of several on my grounds, all of them crowded with berries as much as this one is.



In summer, the clean, fresh green foliage and the wonderful luxuriance of growth are remarkable. Indeed, its rapid growth seemed at first a drawback to its value, for it is difficult to keep the vine within bounds. Its desire for upward growth is such that one branch, growing two or three feet in a few days, stands up from a mass of vines trained horizontally; then another springs up, twining around the first, and then a third, and perhaps a fourth, rapidly mounting. Supporting each other, they stretch up and grasp the branches of a tree or anything else that promises support skyward.

Several years' trial have shown me that this aspiring vine can be trained. I have a gateway arch covered with bitter sweet, and admired by all who see it. The arch is formed of ordinary water-pipe, with couplings and wire netting, two feet in width. An upright of pipe on either side of the gate has a cross-bar of pipe two feet long at its top, and from the ends of the cross-bar spring arches of small pipe upon which is laid a roof of wire netting. The vigorous vines climbed the uprights of the arch like wildfire, and when I bent them down and fastened them to the netting, they soon bristled everywhere with upreaching branches, but under a free use of the pruning shears, cutting back to two or three buds, they behave charmingly.

All summer the clean, thrifty leaves, waxy branches and bunches of plump green berries are a delight to the eye. But when autumn comes and the leaves turn yellow and the berry capsules are orange, I almost think my arch is more beautiful than in summer. Still, again, as winter approaches and the snow begins to fall and the yellow capsules turn back and show coral red berries hanging out from the snowy arch, I am in delight, and at Christmastime when I am asked for bunches of berries for decoration I am selfish enough to refuse to let them go, for they will hang bits of brightness through the long northern winter, and I cannot spare them.

To sum up the virtues of the *Celastrus scandens:* first, it is easily obtained, growing quite commonly along the river flats. It is easily transplanted, having abundant rootlets, or it may be raised from the seed. It is vigorous and free from all vermin. I have never seen a worm upon it, and it is beautiful as I have attempted to describe it in summer, autumn and winter. These virtues ought to recommend it, without mentioning the famous "Grandmother's Salve," which mothers, grandmothers and great-great-grandmothers have praised without stint, and which is made from the berries or roots of the *Celastrus scandens.*

BITTERSWEET.

COW TREES.

ATTENTION OF VEGETARIANS IS ESPECIALLY REQUESTED.

Among peculiar products may be classed vegetable milk, and among interesting vegetables, the various cow-trees. It is much to be regretted that the attention of strict vegetarians has not been called to the possibility of excluding animal milk from their dietaries, for had their attention been seriously called to the cow-trees, we would have had more information to offer than this which we have been able to collect from our reading. We have noted eight species of plants which furnish an edible milky sap, belonging to eight genera and seven natural orders.

Brosimum galactodendron (Urticaceæ). In 1633, Laet, in his *descriptio indiarum occidentalim*, lib. 18, says that in Venezuela there are trees which give out a liquid which coagulates like cheese, and which is eaten at meals. This tree, peculiar to Venezuela, was observed by Humboldt, who says that the vegetable milk of the *palo de vaca* [*Galactodendron utile*, H. B. et K.] has an agreeable taste and an aromatic smell. At Caucagua the natives call the tree *arbol del leche*, milk tree. The further account is quite pastoral. "On the barren flank of a rock grows a tree with coriacious and dry leaves. Its large woody roots can scarcely penetrate into the stone. For several months of the year not a single shower moistens its foliage. Its branches appear dead and dried; but when the trunk is pierced there flows from it a sweet and nourishing milk. It is at the rising of the sun that this vegetable fountain is most abundant. The negroes and natives are then seen hastening from all quarters, furnished with large bowls to receive the milk, which grows yellow and thickens at its surface. Some empty their bowls under the tree itself; others carry the juice home to their children." Samples of this milk analyzed by Boussingault showed it to contain :—Water, 58.0; wax, etc., 35.2; sugar, etc., 2.8; casein, 1.7; alkaline earths, alkalis, phosphate 0.5; undetermined 1.8 per cent. Seeds were germinated at Kew Gardens, England, in 1881, and plants sent in 1882 to Australia, India, Feejee Islands, Java, Singapore and Ceylon.

Clusia galactodendron (Guttiferæ). This is another of the *palo de vaca* or cow-trees of Venezuela. The milk is said to be used freely by all, especially by children, although it has an astringent taste. It is said that one tree of this species will yield a quart in an hour.

Tabernæmontana utilis (Apocyneæ). The cow-tree of British Guiana and Demerara is called *hya-hya* by the natives. The lactescent juice is said to be bland and wholesome, resembling cow's milk in appearance, but rather sticky. Brown says: "The Indians showed us the milk tree, from an incision in the bark of which we obtained a good flow of thick, white, creamy sap, of a rich nutty flavor, but a little of it went a long way." This tree was described by Arnott in 1830.

Mimusops elata (Sapotaceæ). The cow-tree of the Amazon. Herndon says it is called there *echenique*, and that the fresh milk was used as a food and a beverage. As brought to him, it had a foamy appearance as if just drawn from the cow, and looked very rich and tempting. It, however, coagulates very soon, he says, and becomes as hard and tenacious as glue. Bates says the milk is pleasant with coffee, but has an slight rankness when drank pure. It soon thickens to a glue which is exceedingly tenacious. He was told that it was not safe to drink much of it. Wallace says the milk exudes in abundance when the bark is cut; it has about the consistence of thick cream, and but for a very slight peculiar taste could scarcely be distinguished from the genuine product of the cow. Another authority gives the name of the tree as the *Massaranduba*.

Malouetia lactiflora (Apocyneæ). Miers says this is a very lactescent tree, yielding in South America a vegetable milk used by the natives, and also forming a useful varnish, according to Schomburgk.

Asclepias lactifera (Asclepiadeæ). The cow-tree of Ceylon. Burman relates that when cow's milk is wanting, or for other reasons, the juice of this plant affords a substitute, and that the leaves are also cooked with foods that require animal milk.

Euphorbia balsamifera (Euphorbiaceæ). In the Canary Islands, this species is called *Tabayba dulce* and the juice is sweet and harmless, as Humboldt says. The juice is said to be similar to sweet milk, and thickens into a jelly to be used as a delicacy. It is doubtful whether from this scant mention this species should be included among cow-trees.

Mammilaria simplex (Cacteæ). This species is said to yield a sweet, milky and wholesome juice.

E. LEWIS STURTEVANT.

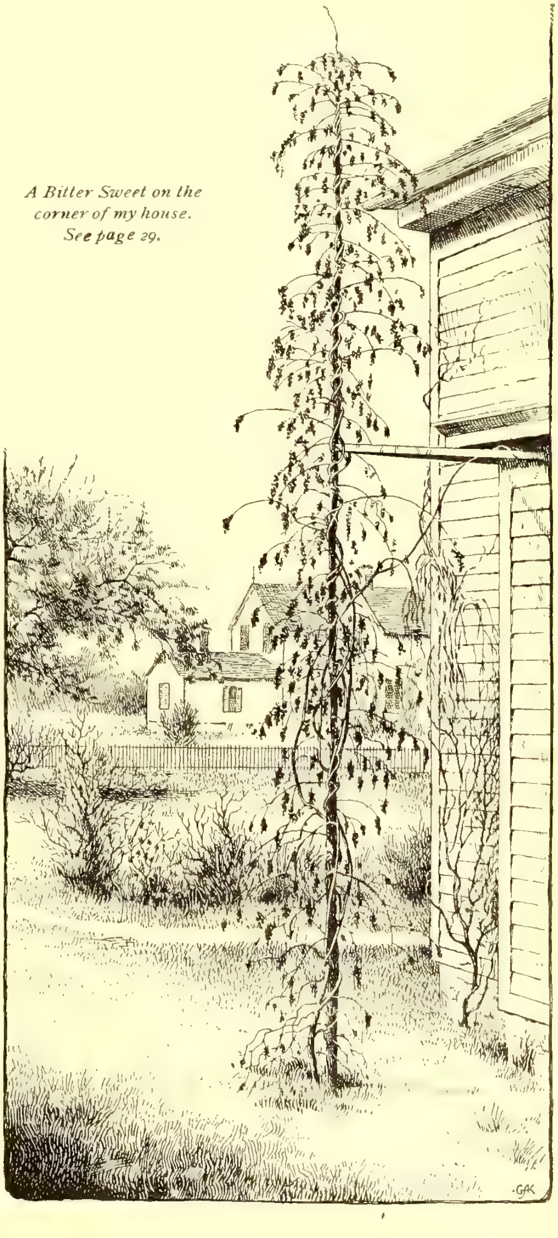
CULTIVATION OF THE TUBEROUS BEGONIA.

The tuberous begonia, when better known, is destined to become one of our most popular flowers. Its free-blooming qualities and lovely shades of color cannot be excelled, if equalled by any class of plants, the costly orchids not excepted. The great strides that have been made by the hybrids since the introduction of *B. Sedeni* have quite eclipsed the expectations of the most sanguine, for now we have the single varieties with almost circular flowers and ranging in color from the darkest crimson, through all the intermediate shades of scarlet, pink and white, to the deepest yellow, and the substance of the flowers, together with the ease with which they can be grown and their freedom from insects, will command for them a foremost place in the near future.

The double varieties are indeed most lovely objects, for now we have them with erect stems and large flowers looking us in the face like hollyhocks and camelias, and such exquisite colors! Those with slender stems have also their advantages, being well adapted for hanging baskets in a cool conservatory or elevated in a position where they can be seen from below. The fact of their not requiring attention in winter ought to commend them to those not possessing a greenhouse, for the bulbs can be stored away in a closet or any convenient place where the temperature does not fall below 50° F. They must not be put near a stove or hot pipes, as the heat is apt to cause them to shrivel.

To obtain new varieties necessitates their being grown from seed, which should be purchased from a good strain and be sown about January, or not later than February; for to obtain best results the larger the plants are by May, the better chance they have of success afterwards. My system of culture follows. In the first place, prepare a clean seed-pan or pot by filling with crocks to within two inches of the rim, over which place some half-rotten leaves or rough material to prevent the soil from washing through and choking the drainage. Then prepare some finely sifted leaf-mould with about one-sixth of clean fine sand added, placing the rougher portions of compost over the leaves, and finally adding not more than half an inch of the fine soil; press it gently with a flat surface till it is perfectly level; water it through a very fine rose. After it has drained for an hour or so, it is ready to receive the seed, which should be sprinkled regularly over the surface, but on no account cover it with soil or the tiny seedlings cannot push through.

Place the pans in a temperature of about 70° and cover with a sheet of glass to prevent evaporation; the glass should be removed at night and replaced in the morning. When the seedlings appear, which is usually in about ten days, they must be removed altogether, and not be allowed to get dry when germinating; yet great care must be exercised in watering, on account of the seed being so small and easily dislodged. When they begin to make the third leaf they must be transferred into other pans or shallow boxes well drained, and grown along in the same temperature but carefully shaded from bright sunshine. As they progress they need to be placed in boxes, the plants about two inches apart each way. Give sufficient air on all favorable occasions to



A Bitter Sweet on the corner of my house. See page 29.

keep them sturdy, and gradually inure them to the weather so as to have them ready for planting out in May, as soon as danger from frost is gone.

They should be planted out in beds in an open location for preference, where they can be shaded for an hour or two during the hottest part of the day, and be regularly supplied with water. Should the weather be hot and dry, a good mulching of manure from an old mushroom bed helps to keep them moist and prevents the soil, through frequent waterings, from becoming hard. About the middle of July they will begin to bloom and keep continuously on till frost cuts them down. They should then be cut off to within two inches of the ground and put in an open dry place. When the stems fall away from the bulbs, which is about ten days afterwards, they should be stored away until spring. By marking them when in flower, the best can be selected for growing in pots for conservatory decoration, and the inferior ones kept for bedding, which purpose they answer admirably, making larger plants and blooming earlier than seedlings.

T. Griffen.

SOME LITERATURE.

VALUABLE INFORMATION FROM THE GOVERNMENT.

"Of making many books there is no end," and of the fashioning of bulletins there is no limit, and no precedent. There are kinds to suit all tastes, and and no tastes. The most entertaining are the bulletins of promise. Like promissory notes, they are easy to make. One would think that the millenium of agriculture were sure to come within a twelvemonth. Cattle feeding, forage plants, chemistry of everything in the soil and above it, science of the winds and rain, diseases of plants, diseases of animals, kinds of vegetables and fruits, methods of cultivating everything, science of insects and birds, and a score of other definite and simple problems are to receive attention. This is one way of saying, "we are ready for anything." Promissory bulletins, like the first chapters of books, are easy to write. Somehow one warms up to his subject at an amazing rate when he grasps his pen and stabs it into a new field. Promises roll off in ink drops, and it is hard to close the chapter.

Akin to these bulletins are the explanatory ones. They assume the reader to be a child and then proceed to explain with the most painstaking minuteness. It is all made so clear that one wonders why he needs to know it—and perhaps he does not need to know it.

Then comes the bulletin with a report of progress—a list of trees and shrubs and vegetables which will drive a catalogue maker to shame. A useful bulletin this, for it informs people what the station owns, and that is information which we all want. Now and then we get the big bulletin, groaning under a load of a couple hundred pages. Capital volume this for the top shelf of a closet cupboard, where, like the Raven, it sits "evermore."

The statistical bulletin is common. It stares at you with great rows and columns of figures, and you sink back into your chair completely squelched. Figures never lie—so they say—and you are appalled at the amount of truth which these bulletins must contain. But in four cases out of five you cannot find the truth, for the phenomenal author has not had the time to give you any conclusions or summaries. There are no short cuts. And the best you can do is to carefully light your pipe with the leaves, one by one, and hope to inhale some of the ponderous facts. Nothing so impressess one with the inexhaustible resources of the human mind, as this ability, which some people possess, to go deliberately into the field and count the number of peas in a thousand pods, to compute how many flowers there must be in a row of pumpkins, to weigh a hundred turnips, and then to go home and put down the figures! What do the figures teach? Why that, sir, is no part of the matter. It is enough to have the figures.

There are tardy bulletins. Along in November comes a bulletin, dated last January or May. It is necessarily apologetic. It covers the emptiness of the intervening months. This is the quintessence of convenience, this dating back of bulletins. It meets the requirements of the law—in a measure—and enables the winter to take a long and deliberate retrospect of months of idleness. Or, perchance, the writer is free to admit that he has no experiment to report, but he falls back upon that convenient and well-saddled see-saw, "a great many applications have been made for this information," "this bulletin is written in answer to questions from numerous applicants," etc., etc. But we should not hold the bulletin writer to too strict an account in this connection, for perhaps half our rural books are written—or are said to be—in response to just such demands upon the noted author's time and inexhaustible knowledge.

Then there is the grandiose bulletin, which Micawber would have delighted to read. "And now in conclusion," runs a Louisiana cotton bulletin, "permit me to say that no other crop has within it so much promise and potency as that which we of the South have so long deified as King Cotton. It clothes the world with the cheapest and best garments; it furnishes the lard for our kitchen, the oil for our salad, the butter for our bread, the soap for our toilet and the candles for our bed-room. It feeds our Jersey cow, it fertilizes our garden and field crops. It paints our houses, dyes our hosiery and makes our ointments. It furnishes us with paper, delicate enough to receive the sweetest strains of whispered love, or strong enough for the wheels of the ponderous locomotive. It gives us thread as fine as the spider's silken web, or strong enough to lash the navies of the world together. Such, now, is this wonderful plant, and who can deny the magnificent possibilities of its future?" "Cotton is emphatically the child of the sun and flourishes only in warm latitudes. Its heliotropic tendencies are even more marked than the poetical sunflower. Its leaves receive the first glow of morning light, and following the king of day, dismiss it at eve in the west with dewy regrets."

Whoop! Up we go in a flurry of smoke and glory!

And this cotton bulletin continues; "Compost, compost is the word. The modern olympus is a compost heap and the god enthroned on it is called Jupiter Ammoniac."

Shades of Homer! Now let us substitute this recent mythology for the old, in that august council of the goods before the second battle:—

Now morn in saffron robes had shed her light,
O'er all the earth, when Jupiter Ammoniac,
Summoned the Gods to council on the heights,
Of the many peaked Manure-pile.

R. T. Choke.

TWO PRIVATE CHRYSANTHEMUM SHOWS.

REPORTED BY A LANDSCAPE GARDENER AND A FRUIT GROWER.

Why is it that many refined 'people of ample means make their homes so attractive in winter as well as in summer that they choose to live in them the year round, in preference to having a city home for the colder months, while other country places become as desolate as bits of Sahara on the approach of winter? The whole credit may be given to the art of horticulture. This has made the homes attractive and encouraged attention to other arts and created a society that would not perhaps be bound by the claims of horticulture alone. Of such a character is Short Hills, N. J., and our objective point was the nurseries of Pitcher & Manda, which was merely the natural outgrowth of James R. Pitcher's great love of gardening and of his extensive private collections, clustered around a beautiful, hospitable country home, already described in these pages in years gone by.

The occasion of this visit was a special exhibition of chrysanthemums in November. The advent of the Mrs. Alpheus Hardy, of which this is the home, last season, was the most prominent outburst in favor of this popular flower that has yet occurred, and has done more to attract the public attention than any other one thing, and together with the frequent public exhibitions has resulted in creating a sentiment amounting to a craze. The developments have been no less in the size of the flower than in the variety and blending of colors. Black and blue have, we believe, yet failed to respond to the hybridizer's magic wand, but of white, yellow, cream, straw, bronze, purple, pink, etc., with all intermediate shapes and grades there is no end, a bright vivid scarlet perhaps being the most limited and hard to obtain.

Passing through the palm and orchid houses we came to the entrance of the chrysanthemum house, where a grand display met our vision. As we wandered through and had about decided on a certain variety as meeting our "ideal," it was only to change our mind at the next step and go on repeating it till the circuit of the house was made.

The Mrs. Alpheus Hardy was blooming in all her glory in this, her naturalized home. We were surprised to learn that the great bed of plants that filled the centre of the large house with plume-like flowers was from cuttings made in June.

Among the thousands that excited our attention and admiration we noted the following as conspicuous for their size and beauty. Of course out of respect to Mrs. Hardy she must head the list of white ones. She was shown in profusion and the largest blooms, 4 to 6 inches in diameter, their incurved petals covered with their fine delicate hairy pubescence, were decidedly unique.

Mrs. Geo. Glenny, creamy white, very full and double.
Robt. Craig, creamy, full double, resembling a pæony.
Sam. Houston, Sunnyside and Snowball, very large and fine.
Belle Pointevine, double, 3 inches in diameter, incurved.
Mad. Louis Percy, large and fine, white
Adirondac, large, full double, white with center yellow; fine.
Alaska, large, very full, center yellow.
Narragansett, large, very full, center yellow.
Moonstone, large, semi-double, white, yellow center.
Shasta, fringed double, reflexed, odd and fine.
Puritan, large, double, incurved, white and pink.
Mrs. Frank Thomson, large, white and pink; excellent.
Mrs. Tattler, large, white and pink; fine.
Lillian B. Bird, delicate cream and pink, double and full.
J. Collins, pink and bronze, large, full, double.

Hero of Stoke Newington, large, beautiful blush pink.
Tubiflorum, petals fine, pink and white.
Chas. S. Ware, large, semi-double, pink.
Rubrum Striatum, large and fine, petals striped with red.
M. Delaux, fringed, large, light magenta.
Chas. Delmas, Luzon and Coquette; amber, fine.
Wick Fils and Lady Mathison, double, brick red.
President Hyde, large, double, yellow.
Cloth of Gold, double, yellow.
Wm. A. Lincoln, very large, yellow.
Edward Molyneaux, fine, Mrs. Wheeler type, crimson and bronze.
Golden Queen of England, large, creamy yellow.
Peter the Great, large double, full, yellow.
La Fortine, large, bright crimson red.
Ramona, large double, yellow and pale amber.
Sachem, petals and flower large, orange.
Brazen Shield, large, wide petals, yellow, fine.
Monadnock, curled or tubular, yellow, loose.
Grandiflorum, large double, yellow.
Brahma, medium, full, double, yellow and red.
Jno. Webster, medium, full, double, yellow and red.
M. Alex. Hugier, tubular, pink and yellow.
Cortez, yellow and amber, large and fine.
Bras Rouge, crimson and yellow.
Jno. Thorpe, solferino.
Refulgence, solferino, aster flowered.
Tacoma, canary yellow, semi double, large.
Golden Empress of India, double, straw colored, fine.
Mrs. And. Carnegie, large, incurved, yellow and bronze.

Although we are told that this is the off season for orchids, it is hard to think so from the splendor of the banks that greet us as we enter each house devoted to their culture and yet when we observe how few of the thousands of plants are now showing flowers, it helps us to a realization of what they must be later on.

The beauty of the exotics so entertain visitors that the glory of the hardy perennials and other garden plants is not always remembered, especially at this season of the year. Over a thousand species are already here, and with the facilities for collecting and the skill in propagation at the command of the proprietors, it is safe to say that there is not much worth having in this climate but what may be found here.

Perhaps a better idea of the stock may be had by the statement that the thousands of orchids are valued at $250,000. The cypripediums alone number over 400 species and varieties. The exotics are provided for in twenty glass houses, while the hardy stock already has ten acres of land devoted to it and there are nearly 400 that can be made available as occasion requires. Among the thousands of perennials are many obtained from rare botanical collections, and hybrids of wondrous beauty that have never before been available in commercial establishments. When these are known they cannot fail to give an impetus to those most desirable forms of gardening, the "wild garden" and the cultivation of hardy perennials in beds and borders.

The following day we visited Castlewood, in Llewellyn Park, Orange, the residence of T. H. Spaulding. Here another surprise awaited us; two houses full, many show plants grown with that special object in view, and they were truly magnificent, showing the possible perfection to which chrysanthemums can be grown. There were not only a few, but scores of plants 2 to 4 feet high with heads 2 feet across and one solid mass of blooms of all colors, shades and shapes, besides thousands of smaller plants. We noted the following as among the best and most conspicuous:

St. Michael, yellow, 2 inches in diameter, small centre, fine.
L. Canning, white, lance-leaved.
Miss Alice Barr, crimson, large and fine, yellow centre.
Yeddo, yellow, free bloomer, fine petals.
Mollie, yellow and amber, very fine.
Fanny Black, light purple, similar style to Alice Barr.
Ada Spaulding, full blush white, creamy centre; nothing finer.
Singerly, purple and crimson, fine and showy, flower medium.
Kioto, yellow, incurved, full flower.
H. Cannell, yellow, incurved, fine.
E. W. Clark, red purple, large.
Mrs. Pratt, white, double, very good.
Theodora, pink, large ray-like, yellow centre.
Miss Esmeralda, dark crimson, Wheeler type in form.
W. W. Coles, dark salmon, fine.
M. Pankosan, amber and pink, large, full imbricated centre.
Llewellyn, unique, narrow curled petals, large flower.
Mrs. Bullock, very full, white, a perfect half globe.
Lillian B. Bird, fine, delicate blush, tubular, fine flower, 4 to 5 inches.
Violet Rose, pink, flat, full center, fine.
Cullingfordii, dark crimson.
Delie, large bronze.
Mrs. Langtry, large white.
Mrs. Tattler, blush rose, very full pæony-like flower.
Grandiflorum, large, yellow, petals incurved like a large lily bulb.
Mons. Bernard, reddish purple, large, flat, center incurved.
Mrs. Howell, crimson and gold, yellow centre.
Owen 79, pure white, full, "double as a dahlia."
Mrs. S. Coleman, yellowish blush, slightly incurved.
Mrs. W. Waterer, very dark crimson, loose, full, incurved center.
Sarah Owen, yellow, pink striped, globe flower, full and fine.
Bronze Jardin, full, incurved.
Garnet, crimson and pink, yellow centre.
Mad. Ed. Rae, very full, pink and red, petals rolled.
Rubra Superba, pink, amber, yellow center.
Claude Frallo, red, pink and white.
Golden Lace, yellow, fringed.
Wm. Holbum, dark red and amber, very full.
Golden Dragon, pure yellow, large loose flower.
H. Lincoln, large, full, deep yellow.
Gilmour, pink and white, unique.
Sunnyside, white, petals tipped with green.
Modjeska, bronze, yellow, full, fine.
Seedling 556, very large, of the Carnegie type.
Cynthie, very dark purple.
Leopard, spotted white on pink petals.
L. Everment, fine quilled, lilac.
J. G. Blaine, very dark crimson, fine.
Prince Karl, purple.
Frank, blush pink, late.

Every time we came to a plant of Ada Spaulding we involuntarily stopped to admire its mass of beautiful blush blooms and compare them to a partially opened pæony. While above we give a list as large as the first, there are hundreds of others not mentioned, many of which are doubtless equally desirable, showing the truly wonderful progress.

Two Who Are Not Experts.

THE GARDEN YEAR.

The rigors of winter teach us appreciation of the summer, and its rest should renew us for the activities of another garden year. Of all men in business, the cultivator has most opportunity of change and respite. As often as season rolls into season or day closes into night he finds variation of occupation and new direction for thought, and the longer recreation of the winter affords opportunity of balancing the outcomes of the year. Into its leisure is brought the success and the failure, and out of it goes energy and hope. This vacation time of the planter is nature's seal to the greatness of his calling, her demand of preparation for a multitude of various endeavors. Land and plants alone are idle; the planter still must grow. The farmer is everywhere more important than the farm. It is the farmer who must widen and ennoble farming.

So the winter becomes the farmer's opportunity. Here the success or the failure of the coming year is born. It is not strange that there is so little success in tilling the soil. Three or four months of intellectual emptiness cannot be expected to produce crops of success. The wonder is that failure is not commoner. A vocation widest in its requirements receives least in preparation for it, and yet most is demanded from it. If respite of winter means anything to the planter, it means greater success and deeper pleasure in the days to come. The garden year should begin with the first days of January rather than with the warming days of April. It should begin in the coolness and candor of leisure hours, and its stimulus should be determination rather than enthusiasm. Gardens fail when planned in the bursting days of spring. Haste and restlessness wither with the drouths of July.

Each year widens the scope of gardening. Markets change, soils deteriorate, varieties grow old, insect and plant diseases increase, and everywhere and at all times men are finding out something new. Into this world of activity the gardener comes, and he must strike into it courageously or fall in with laggards. The time has long since passed when rule of thumb can earn a living. Each year the garden must be planned more thoroughly, and the planning must be an outgrowth of continued thought. Thoroughness of planning always begets ambition and enthusiasm. The growth of plants and the pleasures of the fields become attractive as we think of them and plan for them.

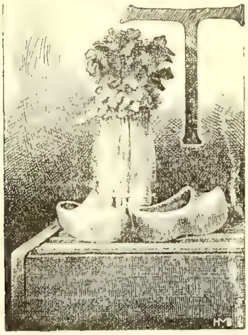
The materials of fireside gardening are now-a-days abundant. Read any of the recent books on out-door life, and you will wonder how you could have lost so much of the happiness which is within reach of you. The first essential to pleasant farm life is contentment on the farm, and no agent so quickly touches and refines the thoughful mind as pleasant books of fields and woods. Yet, in their way, the seedsmen's catalogues of recent years are scarcely less entertaining. All that is attractive in vegetation finds record and illustration here, and one becomes impatient of the dragging weeks that he may again plant and till. With all their faults it is no doubt true that these catalogues have stimulated much of the recent activity of gardening. They are monuments of the advertiser's skill. Someone has called them the "mile-posts of horticulture," and the phrase is not inappropriate. They are certainly records of the year's progresses. In the leisure of the winter days they are profitable for study, if for no other reason than the fact that they are everywhere suggestive. Matters of fact and of practice are presented in bulletins and reports of many organizations. We could not expect to till the soil to advantage in these days without the direct aid of the experimenter. A file of bulletins should be in the possession of every gardener. They are as useful as tools. And even the facts which they contain are often less valuable than the suggestions which they bring. It is not difficult to read and digest the important parts of all this varied literature, and the reader finds himself possessed of a wonderful grasp upon his business.

Gardens should be mapped and planned by the winter fireside. Formulas for insecticides and fungicides should be familiarized, and materials for making the compounds should be procured. Apparatus for applying them should be selected while yet there is leisure. And in all this rounding up of the old year and planning for the new, study of markets and marketing should be conspicuous. It is commonly more difficult to market produce than to grow it.

So the garden year begins in intellectual preparation, and it ends in intellectual review. Continuity of thought and purpose run through its months, and if failure comes, it is a lesson for another year. We join our thought to the thought of the times, with the hope of acquiring judgment and purpose. In no other manner can we have hope of success in these modern days.

L. H. Bailey.

GOLD FROM THE MARSHES OF KALAMAZOO.



THE STORY of Kalamazoo and its celery fields can scarcely be told in space less than a goodly sized book.

Celery seems to be the crop predestined by nature for the utilization of our marsh meadows and tamarack swamps, and if our Hollandish population were not designed for the same end, yet Hollanders and the celery crop have made the lair of the venomous massasauga into miles of smooth and fertile gardens.

Kalamazoo is situated on a burr oak prairie, in the valley of the Kalamazoo river, and the marshes are on three sides of the city. These marshes are crossed by cold and clear streams making into the river at this point.

No word picture can do justice to the view of our valley city as it appears from the ranges of hills on the east or westward. The park-like city in the center, peering at a thousand points through the heavy mass of foliage, all this edged on three sides by hundreds of acres of beautiful fields, striped with velvety black and satiny green that shimmers in the summer sun and breeze, looks far more like a fairy garden than a financial investment by the heavy-footed natives of far-off Holland.

But why did celery come to Kalamazoo? The answer is, We had the peculiar soil, the right climate and the Hollander. Celery was only the missing link; that, when found, put us in ever increasing correspondence with the outside world.

Well, what of it? What has it done for Kalamazoo? Let us see. It brings in a round half a million of money every year; solid shekels, not stock in one or two capitalists' vaults, not money that has to go to the great importing houses of the eastern cities, but 'tis carefully laid away in the old stocking, some of it, and the rest goes for all the necessaries of life, and some of the luxuries, including "clompen and switzer kase." And have we not the second largest express station and the third largest postoffice in the state of Michigan? Is not "Kalamazoo Celery" tacked on to the waving plumes of green that adorn the tables of the lovers of good things all over this broad land?

Celery was probably introduced here by the venerable gardener and nurseryman, George Taylor, who, at the age of 86, may be seen any day busy among the trees in which his soul delights, but his farm was upland and it was up-hill work to dispose of a dozen heads, for the peculiar toothsomeness of this vegetable had not burst upon the palates of the Wolverines. So it was not until ten or twelve years ago that any attempt was made to raise it in quantities for shipment, and the merit of originating the idea seems to lie between two Hollanders, De Bruyn and Van Haften, and an American, the late P. C. Davis. These parties were certainly the first to go into celery with a view to shipment.

How is celery grown? In the first place, a long and violent, or rather patient, wrestling match with many and sundry tamarack stumps above ground and below, willow and alder brush, or the tough and wiry massasauga grass. After the surface is smoothed of all these, the black muck is trenched to the depth of 28 inches and the strong native sod forever turned out of sight, but rarely is the early crop raised on the new land; one crop, or at the best two are all that are attained the first year.

The trenched land is then scrupulously leveled and marked into rows, and the work of setting commences. The young plants from the hot-house, cold-frame or open seed-bed, according to the time of year, are taken to the field in basket or wagon-load, and soon the clean, black plain is dotted with the crouching figures of the celery-growers. Young and old, boys and girls, men and women, all furnish the motive power for this seemingly endless task, and the many hands are not long in striping the jetty soil with tiny lines of vivid green.

The first rows are set four feet apart and kept clear by hand-hoeing or, very rarely, by horse cultivator. In fact, horse cultivation is but little used, as the horses have to be shod with a patent clog to keep them atop of the muck, and, except for marketing and hauling all the stable manure they can get their forks into, our Hollanders are very independent of equine aid.

As the first setting begins to run up, the so-called second crop is set half way between the growing rows, and it is nearly time for the commencement of blanching the first setting. This blanching process is the most important epoch in the life of the celery plant, for the best of celery with a suspicion of green about it is unmarketable. Supposing our plant has made its first growth nicely, its waving foliage supported by the thick, broad stems peculiar to our deep, black soil, no matter if it be not quite so tall as we could wish, it will grow taller but not thicker under the blanching process. Armed with a great hoe, with a blade twelve or more inches long, we pull the muck lightly toward the plant, taking care that the dirt shall not fall into the heart.

In about five days, if all goes well, we repeat the operation, raising the earth almost to the celery leaves, carefully keeping the bottom broad and firming the bank so that the rain will not easily wash it down, and if the big hoe won't do it this time, we must use spade or shovel. Three days later, and the bank is raised two inches more and gently pressed against the plant, but not too hard or the white stalks will rust.

The celery will now be ready to harvest in from two to five days, depending partly on the weather and partly on the variety of the plant.

Another method of blanching (said to have originated here) is in common use, known as "board blanching." For the process are used inch boards free from knot-holes, 12 or 16 feet long, 10 or 12 inches wide; these are laid flat along the rows, one edge just touching the plants. Two men astride the boards raise them by the outside edges, hold them in place with their feet, while they lift up and straighten the stems. The boards are then fastened two and one-half inches apart by means of stout wire hooks or slips of board with notches sawed at the required distance. After the boards are fastened earth is drawn against the bottom, and at the ends of the row a little grass or earth is used to shut out the light and air.

The celery being ready for market, all over the marshes are men, women and boys, pulling, then stripping off the outer stalks with marvelous quickness, trimming the root into shape, or lugging it to the little wash-houses that dot the field. In these wash-houses are a big zinc tank and a bunching table, and the spotless plants are tied in bunches, a dozen in each.

Some of the larger growers ship directly from their gardens, but usually the celery is taken to the commission house, and there packed according to the orders received, five to thirty dozen in a box. Last season there were upwards of fifty firms shipping celery, and their average weekly shipment, by careful estimate, was placed at 50,000 dozens. Most of the celery goes from here by express, but some of the larger shippers have agents at various central points to whom they ship by car-load lots, refrigerator cars being used to transport the product in good condition.

In 1887 and 1888, the sale of Kalamazoo celery was injured by a combination organized here to hold up the price, but this combination broke in 1888, and during the past season Kalamazoo celery, forced on the market at low prices, by its large size and unequaled flavor, soon created such a demand as to raise prices in the fall as high as during the combination.

"Yes, yes," observes Mr. Pessimist, as with corrugated brow and puffed-out lip he gazes over the landscape, "how long is this celery business going to last? Your land must run out, and what then? Other marshes will have to be used."

With "a smile that is childlike and bland" we answer, "Our Hollander friends are intimately acquainted with the virtues of good stable manure, and pay large prices for it, eschewing fancy fertilizers.

"Moreover, our newly reclaimed land does not raise the best celery, for positive proof of which, Mr. Pessimist, you will find in our county records a lease of tracts of land that have raised celery for the last ten years now rented for a term of years at $75 per acre annual rent."

Quoth Mr. Pessimist, with under lip out more than ever, "The fools are not all dead yet." To which we reply modestly, "Neither are our $75 celery gardens."

Mr. Pessimist owns sundry acres of sour cold swamp, some three rods square of which he tried to root up, with the aid of his unfortunate hired man, who dabbled some to-be-pitied celery plants into the mud with an old trowel. Mr. P., remembering the pale and aguish appearance of those plants, stalks majestically out of sight.

There are several requisites to successful celery culture besides the presence of marsh muck. A light deposit of muck above clay sub-soil will not answer. The black muck must be deep. But this must be drained to three feet above water line. It also must be so situated that it will not flood in a wet season.

The area in celery is estimated at some three thousand acres, and the growers are agreed that there is some peculiar mineral element in our marshes that gives the product its fine flavor. All the manure that can be obtained is used, often to the depth of three inches, or as much as can well be dug under. Celery matures here earlier than at any other point in the United States, except in the far south.

Celery is stored for winter by standing it in earth in long, low sheds, well covered with straw or other anti-frost material, and with enough stove heat to keep it above the freezing-point; and so successfully is this done that wintered celery of fair samples was on sale here May 1st, and the new celery was ready early in July. But the bulk of the crop is sold out by New Years. This season it has brought the producers 12 to 15 cents per dozen, and upwards for extra fine.

One of our Hollanders places the value of the three crops produced each season upon one acre at $600, and this at the average prices of the last three years. Much more was realized during the early days of celery culture in this place. The profits of celery raising are like the profits of many other forms of gardening, largely dependent upon the circumstances of the gardener, and while the patient and laborious Hollander has by the untiring labor of himself, wife and children attained enough of this world's goods, in many cases, to retire from active labor, many of our speculators have discovered to their sorrow that unskilled, greedy push, and knowledge of the common ways of the world of grab, are no match in the celery garden for skillful and patient industry. And even these are not always successful, as was shown by the results of severe frosts on May 29th and September 30th last. These did great damage, and in many cases spoiled whole fields. But such unseasonable visitations are out of the common order of things, and there is no reason to fear but that Kalamazoo celery will continue to "wave in the breeze," and delight the palates of our neighbors both near-by and afar-off. Nevertheless, careful estimates of the loss by the late frost makes it amount to $300,000. For the year 1888, the actual sales of our celery were nearly $800,000, and it is easy to see that barring the frosts the crop of 1889 would have passed the million dollar mark —a remarkable showing.

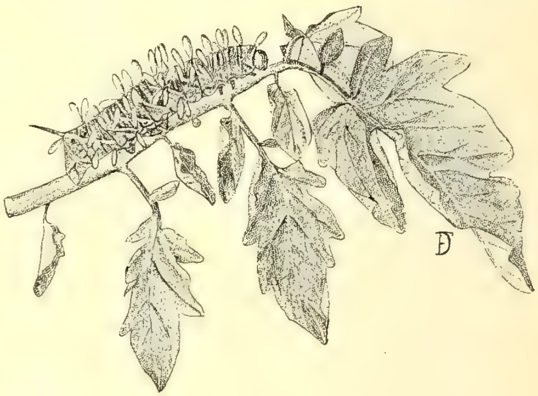
Wm. H. Woodhams, 3d.

THE TOMATO WORM PARASITE.

I am frequently asked concerning the origin of the peculiar egg-like objects often seen on the backs of tomato-worms, and shown in the accompanying illustration. These are not eggs, however, but are the cocoons of a little parasitic fly which is an enemy of the worm, and the way in which they originate is as follows: Some fine summer day, when the tomato-worm is enjoying his meal of the leaves or fruit of the tomato, a small, black four-winged fly alights upon his back, and deposits beneath his skin by means of a long needle-like instrument called the ovipositor, great numbers of minute eggs. In a few days these eggs hatch into little legless grubs which absorb the juices of the worm and develop at his expense. In a few weeks the tomato-worm stops feeding—its body being literally full of the grubs. When full grown, these grubs bore holes in the back of their host and crawl through the skin and escape. As soon as they are on the outside, they begin spinning white silken cocoons, which are the objects frequently mistaken for eggs. Within these cocoons they change to the pupa state, and in about a fortnight emerge as four-winged flies like those by which the original eggs were laid.

Tomato-worms, affected by these parasites, seldom live to change to the pupa state, and never, so far as known, complete their transformations.

But these little parasites do not always have things entirely to their liking, for they are themselves subject to the attacks of a still smaller parasite which destroys primary ones—differing both in form and color. Th s them as they destroyed their hosts. These secondary parasites, as they are called, are quite different from the



TOMATO-WORM WITH COCOONS OF PARASITES.

species of primary parasite which attacks the tomato-worm is called by entomologists *Apanteles congregatus*. It is black, while the secondary species may be either yellowish-brown or brilliant bluish green.

Anyone can get these parasitic flies by enclosing some of the cocoons in a box or other receptacle.

Clarence M. Weed.

THE TOMATO.

SHOWING THE IMPORTANCE OF LOCAL EXPERIMENT STATIONS.

The report of Prof. Bailey, of the Cornell University Experiment Gardens, is not only interesting reading, but highly important from a horticultural standpoint. It is valuable for what it says, and doubly valuable for what it don't say. In the first place, it shows us the value of experiment stations, in determining what varieties can be most successfully and profitably grown in a given soil and situation. But what is more important, it shows the necessity of an experiment station in every township, not under state or university control, but a station conducted by every cultivator in the town, with the headquarters at the town-hall or district school-house, where all can meet and hand in their reports for mutual benefit.

No fact is better known in horticulture than that certain localities are better adapted for the production of a given crop than others; some soils seem the natural home for a given variety, others not. For instance, the farmers in Suffolk county cannot be induced to grow the Early Rose Potato, because there its yield is unsatisfactory, while the White Elephant and Early Ohio, under the same cultivation, will yield more by twenty-five per cent. and upwards. The same is true with many varieties in localities where the conditions are the most favorable. Therefore it is important for the horticulturists of each locality to determine, by experiments carefully made, what is their most profitable industry and what varieties of a given class give the best results.

One of the most noticeable features in this report is the small yield of the tomato in the Ithaca gardens compared with the same on Long Island. The highest test of yield was but 27.5 pounds per plant—the lowest, from seed sown at the same time, was 10.2 pounds per plant. The variety giving the greater yield being the King of the Earlies, that of the smallest being the Paragon, one of our best croppers. Neither of these would be considered half a crop here, if planted in the same soil, which was "a high gravelly loam, heavily enriched."

This experiment shows conclusively that Ithaca is not the home of the tomato. It also shows most conclusively what varieties are best for *them* to grow. It establishes a fact, which every locality must establish for itself.

VARIETIES.—The writer of the report says: "The tomato is one of the most variable and inconstant of kitchen garden plants. As a rule, varieties differ but slightly from their allies, and a considerable plantation and a critical eye are needed to determine many of even the common sorts." True, every word of it, and there is no necessity for half the varieties that are sent out, because they have no valuable properties not possessed by others.

"Varieties of tomatoes are, as a rule, short lived, Ten years may be considered the average profitable life of a variety, and many sorts break up and disappear in two or three years. This inconstancy of type is largely due, no doubt, to the haste with which new sorts are put upon the market." In proof of this, the writer says: "Almost any of the old sorts afford instances of the running out of varieties. The Tilden tomato, once popular, appears to be extinct;" also, "The Trophy shows the same tendency to become inferior, and it is difficult to procure a good stock of it. In the test of 1887 this fact was noticed The Trophy is evidently not as good as formerly. Our crop of this year, from seeds of last year's crop, showed a much greater per cent. of poor fruits than the crop of 1886. Paragon begins to show the same weakness."

To these statements we beg leave to enter a respectful protest, on principle. As to whether "varieties are short-lived," all depends upon the care that has been taken to preserve them. The same care in selection and cultivation of a variety, where the conditions are favorable to its development, as was given to produce it, will preserve it. The tomato is no exception to this rule, although there is no class where the varieties or types will suffer from neglect as quickly as the tomato.

Referring to the Trophy, we would say that this variety, in all hands, has not run out. On the contrary, it has improved, and that by the same means as were employed to develop it, viz: selection. The finest crop of tomatoes we ever saw, without regard to variety name, was of the Trophy, and that only last season, which was generally considered the most unfavorable for the tomato we have had for many years. The grower of these bought the seed from Mr. Waring the first year of its introduction and he has not grown any other since, but has each year carefully selected the earliest and smoothest for seed purposes. The result is an improvement. The fruits are more even; they ripen up to the stem perfectly, and, what is more important, they ripen to the center, producing but little seed. A fault with this variety, when first introduced, was that the center of the fruit was hard and unpalatable.

That the seed now sold will not produce as good fruit as it did fifteen years ago, I am free to admit, Why? Simply because of carelessness in selection for seed purposes. The desire of some in the seed trade is to get seed as cheap as they can, rather than as good as they can. If I were asked the cause of deterioration in this variety, I should say, unquestionably, "Five cents a packet." Some wholesale dealers are quoting this seed at less than half the price it can be grown for, if the grower is faithful to his trust.

CULTURE.—The cultural instructions as adopted at the college of agriculture, commend themselves to the attention of all horticulturists. They are concise and complete. It is well, however, to say that we have seen the best results from such plants as are considered not worth setting at the college, "tall weak plants with a blossom on the top." In setting such, however, it is best to bend the plant down and cover it with soil to the depth of an inch, excepting about four inches of the top; the plant will then throw out roots the entire length of the underground portion, and make a rapid, vigorous, growth; when, if the lank stem is left above ground, the plant will, apparently, grow smaller for two or three weeks after setting. C. L. ALLEN.

[NOTE.—The yields quoted of tomatoes at Ithaca were the yields of certain plants selected for experiment, and the best one is by no means the highest yield secured from tomato plants upon the University garden this year. Yet yields have not been heavy this year, owing to the bad season. The experience with the Trophy indicates that careful breeding has bred a new variety from the old stock, and it thus appears to corroborate the point made in the bulletin, that varieties are unstable.

There is no doubt that variation in soil, season, stock and treatment have much to do with immediate variation in the tomato. In this connection, it will be instructive to insert the following comment upon this portion of the bulletin, from the *Rural New-Yorker*:

"To show the same tomato will vary in different soils and under different treatment let us compare a few of Prof. Bailey's reports with our own. He says that the Haines (No. 64 from Northrup, Braslan & Goodwin) is too irregular. We found it fully as regular as Ignotum. Prof. Bailey considers that "regularity of shape" is one of its "particular points of superiority." In other respects the two reports agree.

"Our report of the Shah (Henderson) and Prof. Bailey's are alike. It has no value. The fact of its being the first yellow with potato-leaf foilage is simply worthy of note. Our own tomatoes, however, were not all yellow. Some were reddish, others orange color.

"Lorillard (Henderson) at the Rural Grounds was not only very regular and productive, but there seemed no reason for designating it as not valuable as a market variety, as Prof. Bailey does.

"McCullom's Hybrid with him was a 'second early.' With the *R. N.-Y.* it was late. Bay State (Bragg) was also late and of no notable value Prof. B. estimates it as 'one of the best recent introductions.'

"As to Prelude, both reports agree. The tomatoes are rather small, but regular in shape, very early and productive."—Ed. AM. G.]

A NEW JAPANESE FRUIT.

Japanese fruits are attracting considerable attention from American growers, especially on the Pacific coast. Our illustration (page 13) shows a branch of *Myrica rubra*, an evergreen fruit-bearing tree from Japan, imported by H. H. Berger, of California, who says: "As this branch had to be carried a long distance before reaching Kioto, where the photograph was taken, a great many of the fruits dropped off, and therefore the branch does not quite show the very prolific bearing qualities of the tree."

The *Myrica rubra* is a native of the southern parts of Japan. It attains a height of forty to fifty feet and a diameter of two and one-half to three feet. The evergreen foliage resembles that of the magnolia. The fruit resembles the blackberry, and is about an inch long by three-quarters of an inch in diameter. There are two varieties of this fruit: one a dark red, almost black; the other a light rose, which in flavor is superior to the other sort. The fruit of each is said to be delicious as a dessert fruit or for making preserves. It is highly flavored, vinous and sweet.

The tree is very ornamental, and the timber is used in Japan for the making of the finest cabinet-ware, the wood being light, tough and very durable. The tree is hardy only in latitudes where the thermometer does not fall below 15 degrees above zero, say from lower Virginia southward. Mr. Berger writes that "there is no doubt but that the tree will be a valuable acquisition to the southern states. Unfortunately its nature does not admit of planting out in cold climates. It is well adapted, however, to pot culture and might be made to yield well under glass. Plants are not yet obtainable, as the Japanese have never propagated the tree beyond the chance seedlings."

The propagation of this species is best accomplished from seed, to which it comes true, or by grafting scions from a fruit-bearing tree on seedlings. We understand that fresh seed is obtainable now, but only in small quantities.

NOMENCLATURE OF VEGETABLES.

The Association of American Agricultural Colleges and Experiment Stations, at its Knoxville meeting in January, 1889, appointed a committee to devise methods for co-operative work in horticulture, and especially in testing new varieties of fruits and vegetables. This committee called a meeting of Station horticulturists at Columbus, Ohio, in June, 1889, for consultation. At this meeting a committee on the nomenclature of vegetables was appointed, consisting of L. H. Bailey, E. S. Goff and W. J. Green. The report of that committee, together with the rules for nomenclature formulated by them, are presented herewith.

Report of Committee.—The committee believe that all interests will be subserved and that dignity will be secured, by simplicity and good taste in the nomenclature of kitchen-garden vegetables. To this end they have formulated a series of rules on the naming of vegetables.

Reform in this department of horticultural nomenclature should be prosecuted as vigorously and successfully as it has been in the nomenclature of fruits at the hands of the American Pomological Society. The committee are confident that brevity, accuracy and good taste in the naming of vegetables are perfectly compatible with the purposes of trade, and therefore solicit co-operation in this work not only from all writers upon horticultural topics, but also from all dealers in seeds and garden supplies.

A name is bestowed upon any plant solely for the purpose of designating it; it is not the province of a name to describe the plant. All description is properly a part of the text. This description should present a characterization of the variety, rather than a mere list of adjectives intended to catch the eye. The committee desire to suggest that a variety never be described under a name which is accepted as a synonym; if the synonym is used as a leader, it should stand only for the purpose of making a reference to the proper name; as, *Ivory Ball*—see *White Apple*.

Rules.—The name of a variety should consist of a single word, or at most, of two words. A phrase, descriptive or otherwise, is never allowable; as, *Pride of Italy*, *King of Mammoths*, *Earliest of All*.

2. The name should not be superlative or bombastic. In particular, all such epithets as *New*, *Large*, *Giant*, *Fine*, *Selected*, *Improved*, and the like, should be omitted. If the grower or dealer has a superior stock of a variety, the fact should be stated in the description immediately after the name, rather than as a part of the name itself; as, "*Trophy*, selected stock."

3. If a grower or dealer has procured a new select strain of a well known variety, it shall be legitimate for him to use his own name in connection with the established name of the variety; as, *Smith's Winnigstadt*, *Jones's Cardinal*.

4. When personal names are given to varieties, titles should be omitted; as, *Major General*, *Queen*.

5. The term *hybrid*[*] should not be used, except in those rare instances in which the variety is known to be of hybrid origin.

6. The originator has the prior right to name the variety; but the oldest name which conforms to these rules should be adopted.

7. This committee reserve the right, in their own publications, to revise objectionable names in conformity with these rules.

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[*] A *hybrid* is the product of true species. There are few, if any, instances of true hybrids among common garden vegetables. The union of varieties gives rise to a cross.

HOW THE GARDEN PAID.

Last season we had three-fourths of a man and half of a horse to each acre, in the way of "help." This was enough to plant, care for, harvest and market the products of the garden up to date. Our greenhouse brought in 50 cents for each foot of glass. The hot beds were run with half a sash to each sash space in the beds, during the time from December to May. The crops sold aggregated in value as much as the value of the land on which they grew. We do not consider the year a very unprofitable one.

Peas were sowed early, matured early, and sold for a good price. Lettuce, both early and late, were good and prices were good. Beans all through the season, in six successive sowings, blasted after attaining half their growth, and the crop was almost a failure; the pods blasted, black spots coming on them, being a total failure in some lines. Potatoes were about half a crop, as they rotted badly. Cucumbers under glass were as good as usual; later ones outside were the poorest crop ever known here —almost a complete failure. Tomatoes were slow to ripen, and there were but few early ones; the bulk of the crop ripened within two weeks, and consequently sold on a full market for only 20 cents a bushel; there was an unusually large crop. Squashes, both summer and winter varieties, were good, but the late ones matured imperfectly, and in the late warm weather have rotted badly.

Sweet corn was very unsatisfactory, having imperfect ears and being of slow growth. Onions blasted when half grown with most growers. Cabbages were very uneven, some very fine and some poor; the crop has been low in market during the fall, but many are holding for an expected rise. Cauliflowers have rotted badly in all stages of growth, and many fine heads rotted after tying up to bleach, Beets, the early ones, were good, the late ones small and many of them below marketable size. Celery never was a larger crop, yet the blast, or yellow leaf, overtook some lots in the later stages of growth. Single roots, after being prepared for market, have weighed four pounds. Turnips were as good as usual; the White Egg variety maintains its reputation as a wormy turnip, and many fields of it this year were not harvested, at least for market. Parsnips and carrots are variable, showing both the best and the poorest crops seen in this section for years. Peppers were good but late, and many of them caught by the early frost.

Pole lima beans failed to ripen more than half a crop. The new bush lima matured the larger share of its pods, and very few failed to contain beans. Spinach, especially the fall crop, was particularly fine. Here is given the season's outcome in this section. All thing considered, we call it an average year for profit.

The failures are largely due to cool, wet and cloudy weather. Such experiences point anew to the value of glass in the garden, and the grower that keeps up with the procession must use more and more glass.

An object lesson in growing under glass has been two houses under one management, one of them a 12-foot wide span roof house covered with hot-bed sash, on rafters of 2x4 stuff; the other a lean-to house facing the south, set with 16x24 glass, on 2½x1½ inch rafters. Up to November 15 no artificial heat was used in either house. In the house set with large glass, the lettuce has grown as fast again and looks better every way, and yet in this locality the new houses are put up on the narrow glass, heavy-rafter, span-roof plan. I propose to use after this only the large-pane, light-rafter pattern for all new work. This matter of building, heating and using glass structures is a very important one, and also one on which growers differ radically; we do not seem to follow any one man's lead, but every one his own ideal, and the end is not yet. New methods open up constantly, and the man that is without sufficient complement of glass is sure to lose ground.

Hampden County, Mass. W. H. Bull.

THE FLOWER MARKETS OF NEW YORK.

The flowers sold in the metropolis always receive admiration from our visitors, and good judges say that the best are the equal of any in the world. In forced roses and lilies we are ahead of the world. Much inferior stuff is sold here for low prices, but those who want the best during the "season," must expect to pay liberally. In spite of the complaints of high prices by some unthinking people, it is difficult to see how even those easiest grown could be sold more cheaply. For example, the common ox-eye daisy, which grows as a weed in meadows costs nothing to raise, and sells for ten cents a bunch in their season. We have been told this was too high for some people who like them, but those who advocate "flowers for the poor," must remember that even these cannot be "cut down as grass" and piled as hay. They must be culled and packed so as to arrive in market in good condition, or they will not sell at any price. This takes skill and understanding. Expenses of transportation must be paid. The time must be short or the flowers will wither. When all these conditions are met, we do not believe the price can be bettered for buyers.

Most of the flowers sold here, and the trade is estimated some years to amount to nearly $5,000,000, are florists' flowers. The favorite roses come first and range in prices from $1.50 for a single flower, to ten cents for a large bunch, according to the variety, the season, scarcity and demand. Carnations come next, and then violets. The latter are always in demand, and the supply is rarely equal to it. Everybody is fond of them, and the violet disease has made it difficult to raise them in many places. Orchids find many admirers, but are not within reach of the general public.

Garden and wild flowers are also in demand and have a steady sale in their season. Many of these are sent to market by farmers' wives and daughters, who add to their income by raising a few flowers for market, or gathering wild ones and then sending them by some local shipper. They come from everywhere about New York. The country is dotted with flower farms.

The city life of New Yorkers, and the decorative use of flowers and plants has tended to foster this trade. The daily retail sales of the fashionable florist amounts to hundreds of dollars, and on occasions of special festivity go well into the thousands. Most of the growers make a specialty of one class of things—roses, bulbs, orchids, potted plants, etc. The raising establishments are not especially attractive to visitors, being shorn of their bloom as soon as it is fit for market. The gay show in the seller's window often comes from as many different localities as there are varieties. While most of the world still slumbers, great wagons come rumbling across the ferries, full of nodding ferns and all manner of greenery.

The principal market for potted plants is in Spring street, and by daylight the big wagons are unloaded and the market ready for customers. The enterprising dealers come early to have a good choice, and soon the plants are on their way to stores and stalls. In springtime the street venders have filled their carts and the plants will soon be hawked through all the streets. A little later in the morning the market for cut-flowers near the east Thirty-fourth street ferry opens, located here it gets the main supply from the many growers on Long Island. The surroundings do not inspire poetical thoughts, although conductive to conviviality. Most of the business is transacted in a dingy saloon, where those present can refresh themselves with any of the usual drinks before or after sales. The large baskets of cut-flowers from the smaller and near-by growers are ranged about, while the shallow boxes, hinged in the middle and held by a strap around them, are piled one on top of another and filled with roses and the more delicate flowers. When the bulb and seed farms on Long Island are in their zenith of bloom, the piles of gladiolus, zinnias, calendulas, the sprigs of rose geranium, and lemon verbena are in great sheaves, pansies by the bushel, and dahlias in all colors from blood to snow. The odor of heliotrope mingles with that of whiskey, cheese, violets, sausage, hyacinths and beer, until it becomes insupportable to one not accustomed to it. The flowers are exhibited, and the regular customers among the florists make their selections first. When they have taken all they want, the rest go to the street peddlers, who drive their trade on the street corners and around the elevated railroad stations.

The retail florists are influenced by the tastes of their customers, and many of them make a special drive with one kind of flowers and get up a reputation for them. Excepting for a few rare or scarce things, the flowers are sold by the dozen or hundred. Chrysanthemums, cornflowers, calendulas, etc., are tied up and sold by the bunch; violets in bunches of 50 and 100, with a border of green leaves. Lilies and roses sell by the dozen, as do most flowers on a single stem.

Most of the wholesale stores are situated within a block or two of Broadway, between Twentieth and Thirtieth streets, and here go most of the finer flowers that are regularly sold to the trade. The dealers are commission men, and the flowers are handled on the same principle as are butter, fruit, eggs or any country produce. Large quantities of flowers go directly to the commission merchants, whose warerooms are supplied with large ice chests, where flowers are stored and where retail dealers and decorators come for them when they have a demand. It astonishes a novice to see the apparent roughness and carelessness with which many flowers are handled, but skilled workers can move them rapidly and with little injury. Some of the most delicate kinds, like camellias, are kept in boxes. Lilies have their anthers removed to prevent the pollen scattering over their whiteness, and, with delicate orchids, easily discolored by a rough touch, are kept out of the general market as much as possible.

Although the bulk of the flower-trade is among our own people, visitors to the city, charmed by the unaccustomed floral beauty, are among the best purchasers. Other places are supplied from here, even to the base of the Rocky Mountains and to New Orleans. Although more is done in winter than at any other season, the fashionable summer resorts have drawn upon this city for supplies even as far away as Bar Harbor, and a strange taste has sometimes even preferred the conventional hot-house productions, although ever higher in summer than winter. Flowers in bloom have been successfully sent to England, arriving in splendid condition, and lilies are imported from Bermuda, but these features of the trade are not likely to be great commercial successes. New Yorkers are reproached for want of horticultural enthusiasm, yet they are the most liberal purchasers of flowers in the world.

ECONOMY IN FUEL.

OF THE four methods of heating buildings described in The American Garden for December, only three are available in a greenhouse or other building used for growing plants. Such buildings may be warmed by a flue, by hot-water pipes or steam pipes. The hot-air system used in dwellings cannot be used on account of the leakage of gas and the difficulty of conveying the hot air through a long, narrow building. The flue system is cheap, but dangerous and not effective in a building over forty feet long. The hot-water and steam systems are, therefore, the best for all horticultural structures.

WHAT THE MANUFACTURER DOES FOR US.

The manufacture of hot-water and steam heating apparatus has been carried to a very high degree of excellence, and our best makers of boilers now give us apparatuses that economize the heat of the fire as far as it is practical in our present form of plant houses. It is not the intention here to describe any particular form of boiler. Every maker of standing clearly comprehends the scientific requirements of a good boiler, and they all seek to give the greatest amount of heat radiating surface in the greenhouse with the highest economy of fuel. Some obtain their results by one form of boiler, some by another, and if the buyer will carefully examine the boilers with regard to their heating surface, fire space and circulation of water in the boiler, there will be no difficulty in selecting a good boiler, whether it be for steam or hot water. The setting up of a large boiler and an extensive system of steam or hot-water pipes is a matter that should be left entirely to the manufacturers. They know (or should know) the exact amount of pipe needed to heat a given surface of glass roof, or, in other words, to heat a given number of cubic feet in a greenhouse.

CLIMATE, EXPOSURE AND SPECIES.

The things the maker does not know and which the gardener must know are these: The climate in which the house stands, whether near the sea or inland, whether north or south; the aspect of the house, its shelter from cold winds, and most important of all, the kinds of plants to be cultivated in the building. These points must be carefully considered and a proper estimate made of the number of pipes required. For instance, a tall grape house where grapes are merely gently forced in late spring, on cool, cloudy days in April and May needs only a few pipes. A stove for tropical plants or a forcing house for cucumbers may need four or five times as many pipes and a proportionately longer boiler. No formal rule can be laid down in this matter, because aspect, climate and shelter are elements that have to be considered, and these may vary with every house and may even vary greatly in houses only a few miles apart.

STEAM OR HOT WATER.

The matter of selecting steam or hot water must also be decided by the gardener. For cool-houses the hot-water system is clearly the most economical and for hot-houses the steam system is the most effective, and when used on a very large scale, as when rose or other houses two or three hundred feet long are occupied, is probably the cheapest in first cost and the most economical of fuel. Exact data on this point cannot be easily obtained, and, while both systems have their advantages, it is not possible to state with absolute certainty which is the best. Such a question could only be settled by actual trial of the two systems side by side by trained scientific experts. We can only use in actual practice this general rule, that steam is best for large and very warm houses, hot water for cooler and smaller houses.

ON STOKING THE FURNACE.

In both these systems the universal fuel has been, until within the past few years, hard or soft coal. Now, after the steam or hot-water boiler has been set up, the whole question of the economy of fuel depends on the man who tends the fire. It is the stoker who controls in many a florist's establishment the whole matter of profit and loss. The coal bill is in every plant house the one item that demands the greatest attention. The labor bill may be much larger, but labor is profitable in direct proportion to its cost. The more men in a plant house, the more plants produced. Coal must be used and the less coal required the less the actual cost of producing the plants. If one ton will carry one thousand plants one month in a certain house and in another house the same ton will carry two thousand plants, clearly the cost of growing plants in the second house is one-half of that in the first and the margin of profit is so much the larger.

The stoker does not have a happy lot. There is dust, heat, cinders and plenty of dirty work. It is not exactly a nice trade and, too often, the work of the stoker is left to the lowest intelligence on the working force. In too many horticultural establishments the work of stoking is left to anybody who is willing to do the work for the lowest wages. It is said there are only two people can make a fire—a fool and a philosopher. Now it is not good business to employ any one but a philosopher. Not your conventional fellow in glasses, who potters about over scientific nothings, but a man of sense who understands why and how coal burns, a man who understands how a fire is controlled every day and night by the clouds, the wind and the sun. If there is any one man who should look after the fires in a greenhouse it is the "boss," the owner, or man most directly interested in the coal bill. As he cannot do it, the best plan is to train or find a first-class stoker and pay him good wages. Any one can tell whether a stoker of a greenhouse knows his business by looking at the paths in the garden. They are often made of ashes, and if bits of coal are to be seen among the ashes the stoker is wasting at least fifty per cent. of the fuel and the owner is paying double rates for coal. Except in continuously fired steam boilers where steam is used for high powers, as on ships and in factories, all boilers discharge more or less unburned coal mingled with the ashes. It is a general and always wasteful practice in our dwellings and in our plant houses to throw this coal away. It is the disgrace of many of our village streets that the sidewalks are paved with tons of good unburned coal. People complain of the expense of coal in their ranges and furnaces and permit the cook and the furnace-man to throw half of every ton into the ash bin. In all our large cities hundreds of families depend wholly on the city dust-heaps for their fuel.

THE FIRST ESSENTIAL OF ECONOMY

Of fuel (particularly anthracite) is that all the ashes be regularly sifted and the small unburned coal returned to the fire. The best way to do this is to have the ashes sifted during the day and to put the unburned coal on the fire late at night. Sifted coal makes a very hot fire and when once well on fire and burning with a yellow flame will burn a long time, provided the draft is slow. The writer has had many years experience in firing both hot-air, steam and hot-water furnaces, both in dwellings and in greenhouses, and in his experience half the coal (anthracite) is thrown away if not sifted.

The usual rate of furnace coal burned in a small house with four registers is from six to eight tons. The usual rate in ranges and cook stoves is from one to two tons per month, according to the size of the family and the character of the cook. In the writer's house (story-and-a-half, 33x35 and on a very exposed hill-top) five tons is sufficient for one season. This high economy is largely the result of a complete sifting of all the ashes every day. It is a gratifying circumstance in this connection to notice that coal sifters are on the market and are largely used. If they were always used there would be less complaint of hard times in the domestic expense account.

COST OF FUEL.

The next most important point is the size of the coal. In the writer's experience two sizes of coal are best, one of the usual "furnace" size and one of "nut" size or "small stove" size. In starting the fire see that the ash pit is clean. It never should be otherwise. All ashes should be removed as fast as they gather. Many a grate has been ruined by allowing ashes to bank up under the bars. Start the wood fire with light kindling and when well started add hard wood, and on this, when well started, place enough furnace coal to just cover it. Give it all the draft until the coal is about half lighted. Then add a little more (say one good shovelful). When this is burning briskly with blue flames on top, add one shovelful of the fine coal. Keep up the draft until this is beginning to burn and then add more fine coal, enough to completely cover the fire. Keep on the full draft till this coal is fully on fire with yellow flames only. Now close the draft completely and this mass of coal will burn steadily with a powerful heat for from four to ten hours without further attention, according to the weather.

Such a method of starting a furnace fire takes an hour or more, but once done the fire keeps in good effective condition for many hours. The exact time depends wholly on the state of the clouds and the force and direction of the wind. With a clear sky and no wind it will burn from eight to twenty-four hours without attention and give a moderate amount of heat for the whole time. With a high wind, particularly a north wind, it will burn out in four hours or even less time. The economic use of the coal in the furnace, therefore, depends wholly on matters out of doors and quite beyond our control. The stoker's art consists in governing the draft according to the condition of the weather. With a cloudy sky by day or night without wind the fire requires more draft than with a clear sky without wind. If on a cloudy day the sky clears, the fire will at once burn faster and to save coal the draft must be reduced. A wind always quickens a fire and the higher the wind the greater the care needed in reducing the draft. A warm southerly wind does not urge the fire so much as a dry northerly or westerly wind. Rain without wind requires plenty of draft. Rain with high winds means less draft but not so much as high winds without rain. The point is just here: So many pounds of coal are in the furnace; it will burn fast or slow according to these conditions of the weather. Economy in the consumption of this coal is governed entirely by the amount of air supplied for combustion. This means the proper regulation of the ash pit door and the damper in the smoke pipe. In the writer's experience it is far better to control the fire by controlling the amount of air supplied to the fire than to retard or reduce the volume of the products of combustion in the chimney. Burning is a chemical process depending on the supply of oxygen. Cut off the air (or oxygen) and the process is slow and the fuel is burned with economy It is plain that stoking is an art, and the true economy of fuel in greenhouses is in the skill, good judgment and common sense of the stoker.

After a fire has been started in the manner described it will burn from four to eight hours without attention. It will burn very much longer, but if the fire is started in the morning it needs attention again in the evening in order to keep up a good fire all night. The writer's plan is to open the drafts about nine o'clock in the evening and let the fire burn up brightly for from 15 to 30 minutes (according to the weather), and then to add a little fine coal. When this is fairly lighted the grate is well raked out to clear away the ashes. This must not be done until the first coal is lighted, because by this time the old coal is so nearly burned out that it is easily put out if disturbed. As soon as the fresh coal is burning briskly more fine coal is added and then all the sifted coal that has accumulated during the day is put on the fire, covering it over quite dark. In a moment blue flames appear and in from 15 to 30 minutes, according to the weather, all the coal will be a glowing mass of yellow fire. If it is red or white, the draft has been on too long. A little experience will show how long to leave the full draft, but the fire should never be allowed to reach the white hot stage. Such a fire will last from ten to thirty-six hours with a slow draft in quiet weather and be sufficiently alive to start a fresh fire at the end of that time. The average time is, however, about ten hours. The treatment of the fire next morning is very simple. Give full draft till the fire burns up brightly; add a little fine coal. When alight, rake out ashes and add large coal. When this is started fill up with small coal. About once in ten days the fire should be allowed to go out in order to give the furnace a complete cleaning out. The writer's experience has been confined to hard coal. Soft coal burns faster than anthracite, and while it differs in this respect, the actual work of stoking bituminous coals is just as much of an art, and requires the same skill, judgment and observation in governing the fire according to the conditions of the sky and the direction and force of the wind.

GAS AS FUEL.

Within the past fifteen years the people of this country have been given a great object lesson in the economy of fuel. The discovery of natural gas has led tens of thousands of people to consider in their own homes the only really scientific method of economizing fuel. Coal we have had for about a hundred years, and in all that time we have known that gas is also a fuel. We knew all along that gas could be used in cook stoves and in steam and hot-water boilers and in hot-air furnaces, and yet it is only since the discovery of natural gas that we have as a people wakened to a full sense of the value of gas fuels. Even now, while the matter is well understood (see The American Garden for October, page 346), it is difficult to realize that gas is better than coal. Natural gas is only found in a limited district. It is wholly uncertain how long it will last, but if the gas territory should grow smaller and smaller, year by year, even if it should wholly fail, its benefits will be lasting. Coal must and probably always will be our great fuel. Natural gas has taught us how to use it. Coal may be used directly in our furnaces or indirectly, as when it is turned into a gas and then burned as a fuel. There can be no question that the indirect method is the best and the time may come when it will be largely used.

To ascertain if gas can be used to heat hot-air, hot-water and steam boilers for dwellings and greenhouses, The American Garden wrote to all the leading makers of furnaces and boilers in the country and received fourteen letters in reply from the best manufacturers in the business. Of these, ten report that their furnaces and boilers are already used with natural gas. Two report that they have not sold any furnaces or boilers for use with natural gas, but are sure that fuel can be used in their apparatus. Two others report that their apparatus is not adapted to natural gas. Natural gas, as far as its actual use as fuel is concerned, does not differ from artificial gas. In fact, some of these makers report that street gas is used in their systems. In addition to these letters from the makers, letters were received from florists and others reporting the successful use of natural gas in heating greenhouses both by steam and hot water.

In England small greenhouse heating apparatuses burning street gas, have been used in a limited way for some time. Gas fuels, both natural and artificial, are used in cook stoves in all our cities and not less than ten thousand families use gas stoves to-day in this country for all their cooking. Hotels and restaurants use gas largely, and the great Brunswick Hotel, New York, has recently entirely removed its coal ranges and has put in gas ranges for all the cooking of that elegant and fashionable hotel. The writer's own house depends wholly on gas for cooking, bread-making and for all the hot water used in the laundry and bath room.

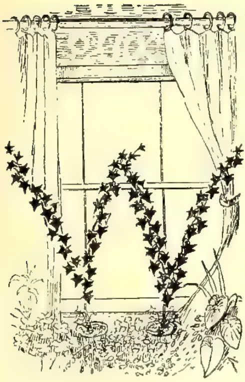
The cost of gas may be a trifle more than coal, but the real cost per gallon of hot water in the bath or wash tubs and per pound of bread baked is less, because no wages are paid for lugging coal from the cellar and carrying out ashes to the yard. There is no dust, no smoke, no delayed breakfast, no coal burning for hours after the cooking is done. Breakfast is served inside of twenty minutes after the kitchen is opened in the morning and the kitchen is clean, sweet and free from dust and heat. It is cold on winter mornings, but a register from the furnace soon warms the room and one burner in the stove keeps it warm all day.

The price of gas has been $2, and the average cost has been $8.65 per month. For this we had the entire cooking, including bread-making for three people and occasional company, all the hot water for the bath room and all the hot water for the laundry, and for warming the room on cold days; also light for two gas lamps burning four hours every night. The price is very high and in many places it would be less and the cost less. A good range with water-back would consume not less than one ton of coal a month, or $6 for the coal and 50 cents for kindling, and then there would be the cost of the two gas lamps. Besides this there would have been the cost of service in handling the coal and wood and removing ashes. If these things have not to be done, clearly the wages paid for service are gained by using the service in other directions. The subject is a large one and next month it is proposed to consider gas furnaces and stoves more in detail.

Charles Barnard.

HORTICULTURE AS A BUSINESS FOR WOMEN. III.

BUSINESS TRAINING—PARTNERSHIPS, WOMEN AS FLORISTS—INSTANCES OF SUCCESS.



WE HAVE tried to show how necessary business ability is in horticultural pursuits. At once the question naturally arises; "Can women form partnerships in business as do men, and make it both congenial and profitable to all concerned?"

We are not prepared to answer this question in detail, for it involves so much that demands the personal consideration of each one for herself. It is a question whether it would be good business policy for two women not of the same immediate family to form a partnership in horticultural work. Especially would such an alliance be undesirable if one of the contemplated partners had more capital than the other. In business operations among men this frequently causes trouble and quick dissolution, especially if both be equally proficient in the work to be performed.

In all business partnerships it is much better for each partner to be equally liable with the other and his or her share of the profits and business also equal. With the partners all of the same family, an alliance might be made which would almost assure success.

One of the most successful local florists in this country owes his success almost entirely to his wife. She is a woman of sound sense, and one possessing an artistic sense which places her in a position to make designs for any desired occasion which are always satisfactory; to-day she can command her price for any piece of floral decorative work and receive it without question. Her husband is a skilled propagator and grower of plants, but one who, through lack of business ability and artistic sense would have utterly failed alone in business, or have been obliged to work for others during his days.

Unfortunately, men have a sense of importance, as foolish as it is uncalled for, which prevents them from giving their wives an opportunity to assist them. Many men have saved their tottering fortunes by confiding in their wives, and many more could have done so had they sought for and acted upon wise counsel from the same source.

We have touched more particularly on fruit-growing, because it seemed to open a field for more women who were in a position to enter the arena than did flower growing. In other words, there are more women living in small towns and villages who have opportunities to engage in fruit culture, than there are in these and other localities who could successfully make the venture in flower growing and selling. It hardly seems necessary in these particular papers to minutely describe varieties and methods. A close watch of the pages of THE AMERICAN GARDEN will give the interested reader all desired information. We have shown in a general way the necessary qualifications to succeed in this work. We have pointed out the advantages and disadvantages of various moves in the work. These directions, it may be well to say, have been gleaned from the leaves of personal experience—experience hard and discouraging at first, but after awhile backed by added wisdom, bringing that delightful feeling of independence which comes with success.

Let us look for a moment at the prospects for women in the lighter, more pleasant, and oftentimes more profitable business of flower growing and selling. Undoubtedly this branch of horticulture appeals more strongly to women than does fruit culture. It is, as we have said, peculiarly adapted to them. It chimes in particularly well with their naturally artistic ability. Women are at home among flowers more than are men. Why, we hardly know, unless it be that the peculiar delicacy of flowering plants and of flowers, and the clinging tender nature of nearly all of them, is in true accord with woman herself.

The field of flower growing is full, but like the law, in the words of Daniel Webster, "There is always room at the top." It is true that it takes some capital to start in business as a florist, and with that business are associated many features not always pleasant to the refined woman. But for all this the field is a tempting one and should be more extensively occupied by women than it now is.

The work in a greenhouse requires a careful, accurate, energetic person and withal one of good taste in the arrangement of both plants and cut-flowers. While perhaps the greenhouse part of the question is quite beyond the reach of the average woman, it by no means debars her from flower culture for profit. New York city contains many women who make a good living in the floral trade. Some of them own greenhouses, but the majority of them do not. Some of them sell their wares on the street corners, others in the corridors of the great theatres. Others still have stores large and small, where they retail the plants and flowers brought daily and weekly from their own little gardens in the suburbs. Many of this class supply those who sell in the street and at public gatherings. Often these latter people are but salesmen for the more fortunate store-keepers.

Then too, there are others who do a general flower and plant commission business. In this case they are much more pleasant to deal with than some of the men in the same line of trade, and what is still more satisfactory to the consignor of cut-flowers, the returns are more promptly made and in more satisfactory sums than from men in the same business.

One instance of success is that of a woman left early in life with a family of small children to support. Her husband had been a florist in a modest way, a few miles from the city. He had a small greenhouse and a few hot-beds with an acre of land. Even this small property was nearly covered by a mortgage. The wife carried on the modest business, increasing it, with the help of her sister to care for the children, by selling flowers at one of the large railroad stations in New York. She was energetic and frugal, and after a few years opened a small store on one of the avenues in the city. Little by little her trade increased. Her children grew up and were educated, but being made to do their part in the work on the little farm at home. At this writing that woman is wealthy, and her wealth has come entirely from this business of growing and selling flowers.

Others in every city of this great country have accomplished great things in this line and others still will continue to do it. There are opportunities in every large town for work of this kind, if women will but take the means at their command, small though they may be, putting aside the false and foolish pride which forces uppermost in their minds the question "What will people say?" Gird on the armor of respectability and good common sense and strike out in this or any other field which leads to health and a comfortable living!

Why not women in horticulture? They occupy other fields, once wholly filled by men, and occupy them in a most satisfactory manner.

The Patrons of Husbandry are taking up and acting upon the question of women's work as connected with their order. Nor are the women of the Grange confined to the work of assisting men. They strike out in a line of their own. Chautauqua, that scientific and literary circle which has worked so much good to the women cf the country, has added to its "days" "A National Grange Day." Everything is pointing to the better education of women in the fields wherein lies the opportunities of earning money, and horticulture and kindred industries are by no means the least of these desirable ends.

ONE WHO HAS TRIED.

[THE END.]

THERE IS MONEY IN THE GARDEN FOR BOY AND GIRL WORKERS.

WORKING ON A SMALL CAPITAL—HOW TO START—GETTING ORDERS—MAKING HOT-BEDS—PLANTS FROM BIG GARDENS.

Second Paper.

WORK, the results of which can be measured by the standard of money, is always most attractive; yet in this series of papers I do not think it best to figure profits in dollars and cents. Why? For two reasons. First because it is impossible to accurately name the profits from a work performed by others—until it is really gained—even though the plans of work as given are closely and conscientiously followed. There are many things which tend to make this as it is; differences in climate, soil and markets, times of planting, weather and the varying degrees of success. Secondly, the vast differences in individual ability.

I may be able to make from my home garden a profit of $25, besides having for the family all the fruits and vegetables needed. One neighbor who worked as hard and systematically and as carefully as myself may make no profit. While another who apparently pays little attention to his work, only weeding and cultivating at the last moment, and being generally careless, may by a stroke of good fortune in which he had no part, as a soil especially adapted to some vegetable, fruit or flower, which brings a good price, be able to double my profit.

As a rule the gardener who spends the most time in the garden, and works faithfully and understandingly, will by no means fail. His reward will usually be in just proportion to his good work.

We have given in detail the necessary qualifications and have pointed out the obstacles to success which may beset us in our start and how to overcome them. We now take our first step in the business, full of energy, determination and business sense.

The question of capital may, and probably will arise, yet the boy or girl worker should by no means become discouraged by lack of means. It is true that we may be able to do much more on a capital of $25 than on $2, but if the $2 is all you have, go ahead. Start as you can in proportion to your capital. Work slowly and carefully, using mental abilities and physical strength, and you will succeed. Begin as you can. If you cannot afford a hot-bed, have a cold-frame. If even this is too expensive, start your seeds in pans and boxes in "mother's kitchen window." She surely will not object, if she sees that her girl or boy is in earnest.

Having determined to venture, let it be known among your grown-up acquaintances that you will be able to supply them with flower and vegetable plants of certain kinds at the proper season. Impress upon their minds that you will aim to have nice, sturdy plants of the best varieties, and at moderate prices. Let them know you are in earnest and mean business, and that you propose doing things in a business-like manner. Have some order blanks printed in the shape of a contract, something like the following :

> *Goshen, N. Y.,* .... *18....*
>
> *Master (or Miss) J. Miller :*
>
> *You will please furnish me at the proper time for planting, in April or May, the following named plants, for which I agree to pay you the prices set opposite the respective articles, on delivery.*
>
> *(Signature of purchaser.)*

If you have a friend who owns a printing outfit, engage him to do the work ; it will encourage him and he may be able to send you customers for plants. He will also probably order some of your plants. If this cannot be done, you will probably be able to arrange with some other printer to do your work and pay him in plants.

Go among your friends and secure their orders early. Get as many in advance of the season of planting as possible, that you may be able to know somewhat of what must be done to fill orders.

The formation of hot-beds and cold-frames is next in the order of work. Let me explain the true difference between a cold-frame and a hot-bed, lest the young worker get a wrong impression from the use of the terms :

A hot-bed, in brief, is a frame made of wood, covered with glass sash and heated either by flues running along the bottom under the earth or by a bottom some inches deep of stable manure. A cold-frame is exactly the same, except that it is given no bottom heat. The impression is frequent that a hot-bed must necessarily occupy a southern exposure and a cold-frame a northern one. This is not wholly true, for while a hot-bed is much better located where the sun strikes it from the south, the location of a cold-frame depends entirely upon the purpose for which it is to be used.

If we desire to raise our young plants in a cold-frame, we certainly do not want it located with a northern exposure, for we must have the benefit of all the sun possible to take the place of the bottom heat we have in hot-beds.

MAKING HOT-BEDS AND COLD-FRAMES.

In making cold-frames we have the choice of two methods. The first, that of making the frame to set on the level of the ground, which is better when the frame is to be used to further the growth of plants transplanted from the seed-bed ; or we can excavate the earth for a depth of two feet and use our frame for keeping plants prepared for sale, or for use in wintering over any plants we may wish to keep. The frame should be of the size to accommodate the size of the sash, which is usually three feet by six, and the back side should be six inches higher than the front. This slope is necessary to catch the rays of the sun to the best advantage, and also to allow the water to run off. It is better to have the bed run east and west, that is, the front side on the south and the back side north. This will give the rays of the sun directly on the frame to the best advantage. If a cold-frame, and built on a level with the surface of the ground, from six to nine inches of soil should be placed in it, into which to transplant the young plants started in the house, or to sow seeds of late spring plants. If the young plants are put from the seed-bed into pots and the pots placed in the cold-frame, little or no earth will need to be put in the bed.

In making a hot-bed, proceed as directed above, except that the soil should be excavated to the depth of eighteen inches, which space is afterward filled in with manure. The best material for hot-beds is horse manure. Select that which is as free from coarse straw as possible, and throw it into a heap. It should be turned over two or three times to rid it of the first intense heat. It should be spread in the bottom of the pit and firmed down by treading upon it until a compact mass some eighteen inches thick is secured. Cover this manure with five or six inches of light soil, and after the first heat has been thrown off, we will be ready to sow the seed. Corn stalks packed closely into the bottom of the pit will answer the purpose instead of horse manure, which is simply to produce heat.

Be careful, and don't begin operations too soon. In latitudes similar to New York city early in March is soon enough to begin arranging the hot beds.

Now we are simply getting well ready for our work.

Another thing to prepare for is some spot in the home garden which we can call *our* garden, and where we may transplant from hot-bed and cold-frame such plants as we want to use for ourselves, or those which are improved by several times transplanting. I hardly think there will be any difficulty in getting your parents to consent to your having a part of the garden, for now-a-days parents seem to have more faith in the budding abilities of their children than they did twenty, or even ten, years ago. At the proper time, which will be when the soil is nicely warmed by the sun and may be thrown up in shape so that it may be worked, we may select our portion of the home lot, choosing that which is high and dry, yet warm and rather moist. There is a vast difference between *wet* soil and one that is *moist.* A wet soil would require to be under-drained, which we do not want to do if it can possibly be avoided.

After removing all rubbish and stones from our small plantation, we must prepare to enrich it. The beginner should place his chief dependence on stable manures until he or she can purchase the better and cleaner high-grade chemical manures.

The manure should be spread over the surface of the soil to the depth of three or four inches, and then spaded in, thoroughly mixing it with the soil. It is a good plan, in order to make the soil friable, to spade the bed over the second time, working in the opposite direction from the first time.

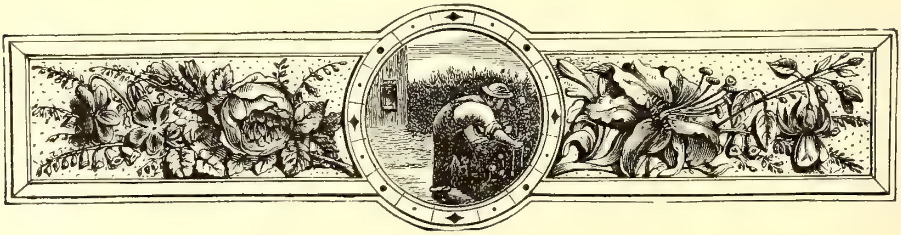
We are now in a fair way for the beginning of our work of planting and caring for the young plants when they peep out of the soil. In our next paper we will show how to prepare the seed-bed when plants are to be started in the house, and give the seasons for sowing all the seeds, so that we will make no serious mistakes in this direction.

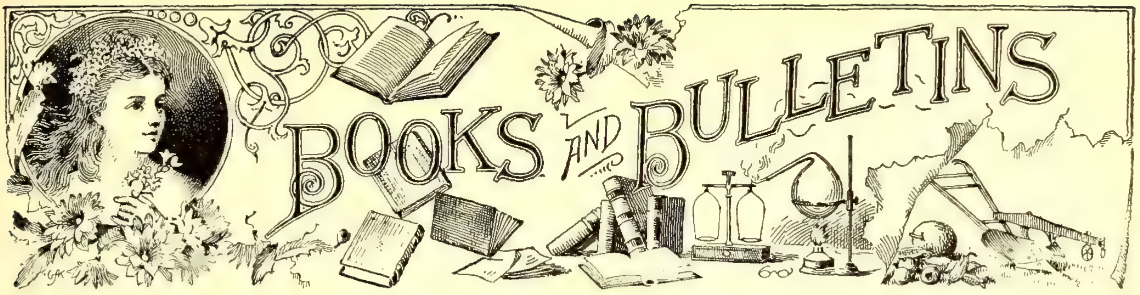
It is interesting to know that our elders are more willing than in the past to foster the growing ambitions of youth even in this work of gardening. Here is one evidence of a desire on the part of a wealthy banker of New York to induce young folk to become more familiar with nature.

The gentleman in question, Edward D. Adams, has an elegant summer residence near the ocean, in the little town of Oceanic, N. J. The paths, roads and terraces of his grounds are bordered with costly plants each summer, and in such quantities that they cannot well be wintered in his greenhouses. The past fall he decided that there was some way to do besides allowing them to be destroyed by frost, so he sent an invitation for the children of the public schools of Oceanic to visit his place. Each child was presented with a plant, and told the object of the giver. The gentleman's plan is this : Each child shall care for his or her plant during the winter, and in the spring there is to be a flower show, at which prizes will be presented to those showing the finest and best-kept plants. We may not attempt to estimate the ultimate good which will result from this plan. We only wish that more wealthy gentlemen would conceive and carry out similar ones. To the boys and girls of the present day we must look for much of the good or bad of the future, and the sooner our elders find out that boys and girls are good for something besides to eat, drink, sleep and be merry, the sooner will they sow the seed which will bring forth desirable fruit.

GEO. R. KNAPP.

(TO BE CONTINUED.)





Folk-Lore of Plants.

THE FOLK-LORE OF PLANTS. *By T. F. Thistleton Dyer. D. Appleton & Co. Pp. 328.* As a popular work upon an attractive subject, this handsome volume is well made, but as a scientific treatise upon an important branch of learning, it has little value. It is a compilation from several comparatively recent issues, particularly in some parts it would seem, from Britten and Holland's "Dictionary of English Plant Names." The folk-lore of plants possesses deep value wholly aside from the curiosity and popular interest which attach to it. The study of folklore is now a promising field in which to glean much of the beginnings of civilization and to trace the progress of culture. The present volume, which may be considered a popular epitome of the most interesting phases of the subject as related to plants, is interesting reading, direct in its style, and broad in its conceptions. The chapters discuss such entertaining topics as plant life—meaning, rather, the spirits ascribed to plants—plant worship, plants in witchcraft, plants in demonology, plants in fairy-lore, love charms, dream-plants, sacred plants, plants in reference to children's rhymes and games, and the like. The reader feels that he is making the acquaintance of sentient beings, rather than plants as we now-a-days meet them. It is from this old treasure house of superstition and story that many of the customs of the present time have come. Even the Christmas-tree is but a lingering trace of the old Druidical tree-worship of our ancestors. One of the most entertaining of the chapters is that upon the curious yet natural doctrine of signatures, which supposed that the external characters of plants indicated the uses to which the plants are adapted. In colors, red was called hot, and white, cold. For blood diseases, red plant organs and tissues were administered to the patients, and for liver diseases, yellow substances were recommended. Many of our plants preserve this old doctrine in their names. Pulmonaria is the old lung-wort, because its leaves are spotted and lung-like, and Hepatica is an old liver remedy, because its leaves are liver-shaped; and it is only in recent years that the Hepatica has been discarded as a liver medicine. To one who has not read folk-lore and who loves plants, this volume will open a new world of treasure.

THE VACAVILLE EARLY FRUIT DISTRICT OF CALIFORNIA. *By Edward J. Wickson. Pp. 149. 12 colored plates. San Francisco. $1.*

The Vacaville Fruit District.

"Its purpose is to present certain phases of California industrial life with accurate portrayal of the environment amid which they occur and the agencies which minister to their existence. In its purpose, therefore, it claims no originality, for there are many publications which have similar aim. It is in its method that this work differs from others, and this difference is its most obvious feature: *i. e.*, the employment of color and the camera in a systematic attempt to make an industrial district better known; the effort to present California, not only in form, but in hue and tint; not choosing the picturesque but the industrial scene; not the features of which the artist joys to present his idealized conception, but the actual; true to topography; true to results attained by formative industrial processes; true to existence in form and color." And Professor Wickson has done in the main, just what he promised to do. It is refreshing to us of the east, who are over full of pictures of California landscapes, to be assured that actual industrial life is to be represented to us. We are becoming suspicious of anything else. And we should feel reassured if this volume had devoted the central space in just one of the dozen plates to a view in a California orchard under the trees, rather than to extensive landscapes with the most captivating bits of colorings. To be sure, the corner pieces and side pieces of these plates often represent orchards, but one feels that they are only incidental to the gorgeous landscapes. We doubt if a horticulturist took all the pictures for the plates. But the text suits us better, although the tendency to make much of large yields and prices smacks of the regulation brochures from our golden coast. The pages are packed with information concerning the fruit-growing interests of the wonderful Vacaville valley, and many of the minor views in the plates possess great value in presenting methods in California orchards. The Vacaville district lies between San Francisco and Sacramento. It is one of the earliest and best of all the fruit-growing valleys of California. It early attracted attention as a vegetable district, and still holds supremacy in this direction. The shipments of vegetables have increased from 7,653,457 pounds in 1881, to 20,001,976 pounds in 1887. Part II is the more acceptable portion of the volume to the person seeking for explicit information. Here the author cuts loose from the plates and presents direct information concerning the growing of fruits and vegetables. Fruits of many kinds are grown in this favored valley. The following figures represent the approximate percentages of each: Peaches, 30 per cent.; grapes, 20; apricots, 19; pears, 10; plums and prunes, 10; cherries, 6; figs, 1; nectarines, 1; various others, 2 per cent. The products are largely shipped east. Good tables are given showing the actual yields of orchards and vineyards, the dates of fruit shipments by many growers in many years, the favorite varieties of fruits for canning and drying, and a chapter is added upon the flora of the Vacaville district. The plates in this volume are the same as in the "California Views," which we noticed last month.

Arsenities and Carbolized Plaster for Curculio.

BULLETIN NO. 53, MICHIGAN EXPERIMENT STATION. *Spraying with the Arsenites. By A. J. Cook. Pp. 8.* Professor Cook has varying results with spraying for the curculio. He finds that the insect is destroyed when rains are infrequent, but frequent showers wash the poison from the smooth fruits. He finds carbolized plaster a good remedy also, under like conditions. This is prepared by stirring one pint of crude carbolic acid in fifty pounds of plaster. This powder is thrown freely over the trees. Professor Cook makes the following conclusions: "The arsenites and carbolized plaster will protect against the plum curculio if they can be kept on the tree or fruit. But in case of very frequent rains the jarring method will not only be cheaper, but much more effective. Again, as our wild fruits are more cleared away we must have plums in our orchards to protect the apples from the curculio. When apples are seriously stung they become so gnarled and deformed as to be worthless. It will pay, then, to set plum trees near by or among the apple trees. Then we will escape mischief among our apples from the curculio, and will only need to spray our apples once, to destroy the codling moth, and can treat the plum trees three or four times with paris green or carbolated lime in case we have only occasional showers, or can jar the trees when the rains are very frequent. For the apples we can use london purple, one pound to 200 gallons of water. For the plums we must use paris green, one pound to two or three hundred gallons of water." We suggest to Professor Cook that he add kerosene emulsion to the arsenite mixture to increase its adhesiveness.

Arsenites and foliage.

Great injury to foliage has been reported from many parts of the country from the use of london purple, particularly upon the peach. Professor Cook made many experiments to determine the cost of this injury, and his conclusions are these: "London purple is more injurious to the foliage than is paris green; and white arsenic—arsenious acid—is more harmful than is either london purple or paris green. This is doubtless owing to the soluble arsenic which is quite abundant in london purple, and almost absent in paris green." 2. "Peach foliage is especially susceptible to injury, and cherry foliage the least so of any of the kinds treated." 3. "It would seem that london purple and white arsenic, used just before a rain, are more harmful than when used during a drought. We not only saw greater injury when a rain followed spraying within two or three days, but secured the same results by spraying soon after treatment with pure water. This also accords with the view that the injury comes from the presence of soluble arsenic." 4. "It would seem that spraying soon after the foliage puts out is less harmful than when it is delayed a few days, or better a few weeks." 5. "London purple may be used on apple, plum, cherry, pear and most ornamental trees, but on these should never be stronger than one pound to two hundred gallons of water. If the application is to be repeated, as it must be for the curculio to prove effective, or if it is to be used in June or July, paris green should be used in the same proportion as above, or else we should use only one pound of london purple to three hundred gallons of water. I now think that this necessity is more due to time of application than to the fact of increased quantity of the poison." 6. "If the arsenites are to be used on the peach to defend against the curculio, paris green only should be used, and that not stronger than one pound to three hundred gallons of water." 7. "The injury done to the foliage is never immediately apparent. It usually shows somewhat the second day, but the full injury is frequently not manifest till the fifth day, and often not till the tenth."

Arsenites and Pasturing.

The bulletin details experiments to determine if sufficient poison falls upon the grass under heavily sprayed trees to cause injury to stock. Samples of grass were analyzed and others were fed to a horse; both the chemist and the horse declared that the poison was not sufficient to cause damage—an interesting conclusion.

Arsenites and Bees.

Professor Cook recites instances of heavy loss to bee-keepers in neighborhoods where orchardists sprayed their trees while in bloom. The adult and immature bees were alike killed. This destruction of bees is entirely unnecessary, as there is no occasion whatever for spraying trees when in bloom.

Arsenites for the Curculio.

BULLETIN NO. 6, OHIO EXPERIMENT STATION, *containing notes of experiments upon various insects. By Clarence M. Weed. Pp. 38. Illustrated.* Mr. Weed has repeated his experiments of a year ago upon the destruction of the curculio on cherries and plums by means of london purple. It has now been proved by several observers that the adult curculio feeds upon leaves and fruits, and spraying with the arsenites has become a settled practice in many parts of the country. Mr. Weed's general conclusions must be convincing in the efficiency of this method of dealing with one of our worst pests: 1. "That about three-fourths of the cherries liable to injury by the plum curculio can be saved by two or three applications of london purple in a water spray, in the proportion of one ounce to ten gallons of water. 2. That a sufficiently large proportion of the plum crop can be saved by the same treatment to insure a good yield when a fair amount of fruit is set. 3. That if an interval of a month or more occurs between the last application and the ripening of the fruit, no danger to health need be apprehended from its use. 4. That spraying with the arsenites is cheaper and more practical than any other known method of preventing the injuries of this insect." The plum experiment of this season gave a remarkable illustration of the benefits of spraying. The untreated trees "set a good crop of fruit, but it was entirely ruined by the curculio, not a single plum being left to mature. The crop in the orchard, however, was immense, one-half the fruit on many of the trees being artificially thinned, and then bearing so much that the limbs bent to the ground, and in some cases broke on account of the great weight."

Striped Cucumber Beetle.

Mr. Weed has made extensive experiments with that persistent pest, the striped cucumber beetle. This is one of the worst insects in the vegetable garden. "Fencing out the insects by covering the plants with some form of tent or gauze-covered frame" was the only entirely satisfactory method of preventing devastation. "The cheapest and most successful method employed is that of protecting each hill by a piece of plant-cloth or cheese-cloth about two feet square. This may be done simply by placing it over the plants and fastening the edges down by small stones and loose earth. It is better, however, to hold it up by means of a half-barrel hoop or a wire bent in the form of a croquet arch." Several styles of these coverings are figured. Other methods employed were the use of hen manure, cow manure, kerosene, carbolic acid, bisulphide of carbon, coal-soot, saltpeter, gypsum, pyrethrum, slug shot and peroxide of silicates. Of these, peroxide of silicates "had a decided effect in preventing injury, and where the plants had been well started before being attacked saved them from destruction. But it did not save them where the beetles were so numerous that they burrowed down to meet the sprouting plants."

New Strawberry Insect.

The strawberry root-louse is a new insect which Mr. Weed names *Aphis Forbesii*, in honor of Professor S. A. Forbes, who first called attention to it. It has proved a serious pest in some parts of Ohio and Illinois, and is no doubt distributed elsewhere. The insects appear in great numbers, from July to the close of the season, "on the crowns and between the bases of the roots, at and just beneath the surface of the earth." The remedies appear to be rotation, and the disinfecting of plants taken from lousy plantations, by dipping the roots and crowns of the plants in kerosene emulsion.

Currant Insects.

The common currant worm is destroyed by hellebore, either in water or dry. Observations upon this pest indicate that when the bushes are stripped of their leaves the fruit crop of the succeeding year is apt to be light. The green leaf-hopper, which attacks the leaves of currants and gooseberries, causing numerous small white spots to appear upon the upper surface, is easily held in check by pyrethrum, applied before the insects are fully grown. Tobacco dust is also a good remedy.

Rose Leaf-Hopper.

The leaf-hopper insects often do great injury to the leaves of rose bushes, both out of doors and under glass. Mr. Weed finds that it is easily destroyed by applying pyrethrum before the insects are fully grown. Tobacco dust or decoction, and whale-oil soap are also good.

Cherry Slug.

The well-known cherry slug has been the subject of attention, and it is found that hellebore, either dry or in water; pyrethrum, either dry or in water, and london purple, were all effective remedies.

Treatment of Potato-rot.

Mr. Weed is one of the first to successfully apply fungicides upon a large scale for the purpose of combatting the dreaded potato-rot or blight. Two acres of potatoes were set aside for experiment. Bordeaux mixture was sprayed upon a part of the plantation on May 28, June 6, June 29 and July 16. To the Bordeaux mixture, london purple was added, one ounce to ten gallons, to destroy the potato bug. The conclusions of this experiment are of great importance: "1. A large proportion of the injury done by the potato rot can be prevented by spraying the vines with the Bordeaux mixture. 2. This treatment frequently diminishes the amount of scab affecting the tubers. 3. By adding london purple to the mixture, the same treatment may be made effective in preventing the injuries both of the rot and Colorado potato beetle."

Apple Maggot.

BULLETIN NO. 2, *Second Series*, MAINE EXPERIMENT STATION. *The Apple Maggot and Potato-Rot. By F. L. Harvey. Pp. 8.* This pest, of comparatively recent introduction into orchards, has been studied during two years, and Professor Harvey recommends the following means of keeping it in check. "1. Thoroughly and promptly destroy all refuse from infested fruits, apple pomace, waste about the house, etc. 2. Promptly destroy windfall apples and infested fruit. 3. Destruction should be immediate after the first of Angust, and nothing short of deep burying, burning or feeding to swine or cattle will be effective. 4. These precautions should be universally adopted. 5. The sale or importation of infested fruit should be prohibited."

In Maine the flies appear early in July and "continue to emerge from the ground for about six weeks or two months. They soon begin to deposit eggs in the early apples, which are at that time from one-half to two-thirds grown." Each female is capable of laying over 300 eggs. There is no evidence of more than one brood.

BULLETIN NO. 6, ILLINOIS EXPERIMENT STATION. *A Bacterial Disease of Corn. By T. J. Burrill. Pp. 12. Illustrated.* This is one of the most valuable bulletins of the year, inasmuch as it deals with a new malady of one of our most important crops; or, rather, it is the first recognition of a very old malady, for "from observations now made, it appears that the disease is a very prevalent one, and probably has existed during the time that corn has been grown on the continent. If so, it has not ordinarily attracted attention and very likely is not destructive enough to be specially noticed. When, however, under peculiar circumstances, the crop is injured to the extent now sometimes known, the loss is very great, not only to individual farmers, but to the country at large."

A New Disease of Corn.

The disease "commonly occurs in spots of various sizes, from a few square rods to an acre or more, and often, though by no means always, on soil of a character somewhat different from the rest of the field." Ordinarily the first indication of the disease is a dwarfed condition of the plants. Later the stalks become yellow and unusually slender, and sometimes the plant dies prematurely. Generally, however, the plants live during the season. "When some of the affected plants are pulled from the ground, they are found to give way too easily in consequence of the death, to a greater or less extent, of the oldest and lowest roots. In anything like severe cases, at least one-half the roots —always the lowest—are injured and usually dead. The bottom portion of the stalk is likewise affected and will be found dead or dying. If split longitudinally through the middle, the inner tissue of this lower part is seen to have a uniform dark color; and a similar discoloration, gradually becoming less and less pronounced, appears in the next succeeding nodes or joints, while the spaces between them (internodes) are seemingly healthy. On the surface when carefully freed from dirt, brownish, corroded spots can be found, sometimes strictly bordered, again diffusely spreading. Sometimes masses of semi-transparent, rather firm, gelatinous material are found upon these external corrosions." After midsummer the sheaths of the leaves become spotted and more or less gelatinous. At last the ears show the malady. "Externally, the appearance of the outer husks is like that of the diseased leaf-sheaths. Internally, in the worst stage, the whole ear—husks, which should be still green, young cob and kernels, and the mass of 'silks'—is reduced to a moist state of corruption, though not ill-scented. The parts lose their normal rigid or turgid quality, appear as if wilted, and are packed closely together, if not actually adhering by the gummy exudation from the tissues. Very often these ears subsequently become mouldy, penetrated through and through by a close, very white, felt-like fungus. Possibly this fungus sometimes makes its inroads into the ear without the bacteria as forerunners; but from present knowledge it seems probable that it is a secondary intruder. These mouldy ears are in certain seasons very numerous and are readily recognized by the husker, as well as by the buyer when the loads are sent to market."

The disease was first noticed so long ago as 1882, and in 1887 the author had made studies of it. There is some indication that it is associated with a virulent disease of cattle and an epidemic among chinch bugs. Dr. Burrill has inoculated healthy corn with the bacteria and has succeeded in producing the disease. The malady has been observed in many places in Illinois, in some cases destroying fields. It is yet too early to look for remedies. There is indication of "more injury on land which has been planted with corn the preceding year, though the rule does not always hold good."

Fruits in Virginia.

BULLETIN NO. 2, VIRGINIA EXPERIMENT STATION. *Experiment Orchard, and Small Fruits. By Wm. B. Alwood. Pp. 16.* Mr. Alwood is evidently inaugurating a vigorous campaign in Virginia. The bulletin in hand is but a list of varieties of fruits already set and an explanation to his constituents, but it indicates a good start. While the station is ready and anxious to test all new varieties of fruits, it "does not undertake to test long lists of seedlings to determine their value, but desires only those which are thought to have merit." This is an example which all stations should follow.

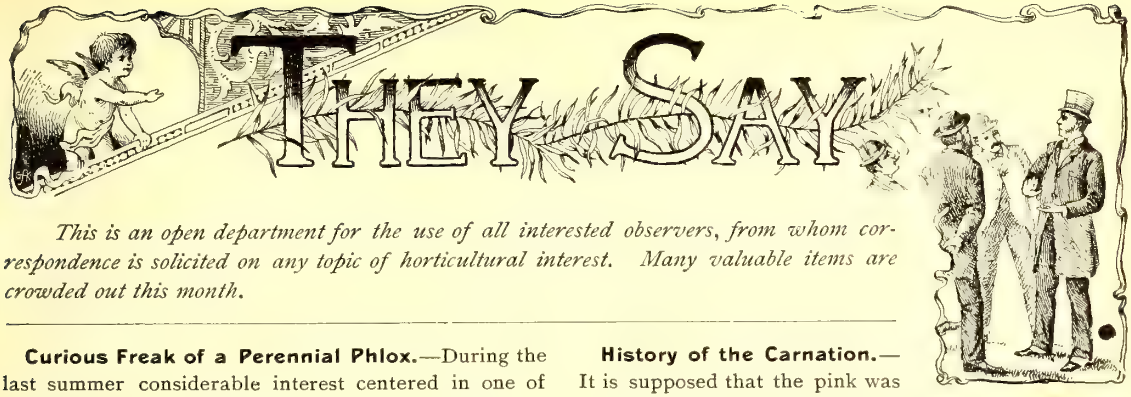
Vegetables in Alabama.

BULLETIN NO. 7, ALABAMA EXPERIMENT STATION. This bulletin contains, among other things, records of tests with tomatoes, potatoes, beans and peas, by James Clayton. The results are tabular, but few conclusions are drawn, and the figures are not full enough to present measures of the varieties. It is wholly impossible, anyway, to construct an accurate judgement of a variety from mere weights and measurements. The only tangible parts of the vegetable records are the following sentences: "Amongst the varieties of tomatoes, especial attention is called to the Acme, Golden Queen, Paragon and several others of Livingston's varieties, as being all that anyone could desire." Among potatoes "the Burbank, Mammoth Prolific and Ross' New Giant are specially mentioned as being prolific, smooth and of good size, while the keeping qualities of the Burbank are unsurpassed."

Peach Growing in Florida.

BULLETIN NO. 4, FLORIDA EXPERIMENT STATION. *Peach Growing in Florida, by James DePass, and Entomologist's Report, by James C. Neal. Pp. 16.* The article upon peach growing is not the result of experiment station work, but is given in lieu of other matter, as the teaching of an "experience of over twenty years in cultivating the peach." The article is a condensed statement of what, where and how to plant. The varieties recommended are largely the products or supposed products of the Honey and Peen-to peaches, which succeed far better than the varieties planted in the middle and northern states. A complete and careful study of these varieties is much needed, yet they are sufficiently understood to make it possible for peach culture in Florida to become a commercial success. The borer, curculio and root-knot are the greatest hindrances to peach culture in the state, but it is only the last which now causes alarm. Mr. De Pass considers deep planting a preventive of injury from root-knot. Planting eight to ten inches deep in high and dry soils is advised. Anything which adds great vigor to the tree is also useful in this connection. "I advise those whose trees are suffering to dig holes by the side of them, fertilize them, and after several weeks, transplant in these holes, cutting them back freely."

L. H. B.



THEY SAY

This is an open department for the use of all interested observers, from whom correspondence is solicited on any topic of horticultural interest. Many valuable items are crowded out this month.

Curious Freak of a Perennial Phlox.—During the last summer considerable interest centered in one of our hardy phloxes, which early in the season began to show signs of color variation. In the morning the flowers were of a clear blue, remaining of this color until nearly noon, when they gradually changed to a delicate pink and by evening were of a beautiful deep rose. This was repeated every day while the plant was in bloom. The variety is Monsieur Maille, and is the only one having this freak in a collection of twenty. It is set close against the west side of the dwelling in rather a clayey soil which becomes dry and hard. It is quite large and blooms profusely for a long period. I can hardly think the freak is in the variety, as another plant of the same kind, in better soil, did not change but remained of one color, deep rose. Then, again, other varieties of rose shades in the same clayey soil and position did not vary in color. The plant has been blooming for three seasons and the past one is the first that it has alternated the blue and rose colors. Can anyone explain? Had the wet season anything to do with it?—JOHN F. RUPP, *Pa.*

Bokhara Clover in the West.—The plant referred to as a "new species" by Omaha and other western papers, which is so rapidly taking the place of the sunflower and the weeds on the Missouri bottom lands, is the Bokhara clover (*Melilotus alba*). It was introduced into the west as a garden plant, but our climate and soil are so like those of its native home in Central Asia that it bids fair to become a first-class weed. Yet under culture it is easy to subdue, and when plowed under as a green manure it is nearly equal to clover as a fertilizer and soil renovator.

It is a matter of regret that the smaller growing species of the melilotus of the black soil sections of Russia had not been introduced in place of the rank growing Asiatic species. This was introduced into England in 1828 from Sarepta on the Volga, under the name of *Melilotus Ruthenica*, but coming from a dry interior region it failed to do well in that moist climate and I think it has been lost.

It is like the Bokhara clover, but it is much smaller in all its parts, grows much thicker, its white flowers and its leaves are quite as fragrant, and stock at Sarepta seemed to relish it quite as well as they did the eastern form of the alfalfa, which is also much grown at Sarepta.—J. L. BUDD.

History of the Carnation.—It is supposed that the pink was unknown to the ancient Greeks and Romans, as no mention is made of it in their writings. When Louis the Pious made a crusade to Tunis in 1270, he was delighted with the fragrance of this beautiful flower, which he took home and cultivated with the greatest care.

At first it was called Tunice, from the place where it was discovered, afterwards they called it Nelke (caryophyllus) on account of its clove-like odor. The climate of the southern part of Europe resembling that of Tunis, the pink has become wild in the South of France and Italy.

It is said that the good King Rene, of Anjou (who died 1480) devoted a great part of his leisure to the cultivation of the pink. He considered it a medicinal plant, and poets sang its praises. In the 16th century it was extensively cultivated in the middle and south of Germany, and in 1597 splendid varieties were introduced into England from Poland. At the same time the Spaniards carried this beautiful flower to America.

About the year 1700 the Dutch turned their attention to the cultivation and propagation of the pink, and brought it to such a state of perfection that they soon counted 360 varieties. The prize of beauty was then, as now, awarded to a perfectly formed, well developed flower of fine color, with unbroken calyx.—E. A. TAYLOR, *Conn.*

Differences in Varieties.—There may be some truth in Mr. Allen's articles on seed growing, in what he says about "naming once in an hundred times the fruit to which the name belonged." Nevertheless had he seen the growth from first to last of my tomatoes which he criticises, the bearing quality, habit of plant, flavor, etc., he might have less difficulty in selecting the varieties. At about blossoming time there was a very marked difference in the plants, so that there was but little difficulty to pick out varieties where the rows ended, etc,, without looking up the labels.

As tomatoes have a more fixed habit than the apple or peach when grown from seed, we need not look for so much diversity of flavors, but that there is a great difference in their quality no one who has studied that particular side will deny. In looks they are more uniform.—N. HALLOCK, *Creedmoor, L. I.*

Winter Care of Amaryllis (Hippeastrum).—In bringing your bulbs out from their resting place to ornament the window garden, repotting is not absolutely necessary unless the pots are overcrowded with roots, in which case, give them a pot one size larger than they now occupy. In shifting do not break the ball and pack the new soil—a strong loam being preferable—as firmly as possible. Put the pot in a tub of water and let it stand for 24 hours, in order that the ball will be thoroughly wet through. Pick all the dead leaves from the top of the bulb, without injuring or breaking the fleshy parts. Then sprinkle a little tobacco dust on the top of the bulbs, which will kill any insects that have made the bulb their winter quarters, and are ready for an attack on the new leaves as soon as they put in an appearance. Do not repeat watering until active growth commences ; then water liberally. Active growth and absolute rest are the requirements of the amaryllis. Bulbs not established, and in a dry state, should have small pots ; a four-inch pot is sufficient for a flowering bulb.—*Queers.*

Does Fruit Growing Pay?—This question has often been asked. We especially allude to the apple. Probably not one person in ten knows how nice it is when one's home is well supplied with choice fruits that will last not only through the summer, but also throughout nearly the whole year. There are, it is true, several drawbacks to fruit culture. Some of the nurserymen substitute so much. The label is right, but the fruit turns out different. Oftentimes you set a small and worthless yellow apple where a red and first-class one was ordered or *vice versa*. Another drawback is that eight out of ten men are too indolent to attend the few trees that they do plant. I here give a list of apples for family and market use which I know from experience to be excellent.

Summer, Family.—Early Harvest, Early Joe, Summer Rose, Primate, Fanny, Garden Royal, Golden Sweet.

Summer, Market.—Red Astrachan, Yellow Transparent, Keswick Codlin, Williams' Favorite, Summer Pippin.

Fall, Family.—Gravenstein, Porter, Chenango Strawberry, Fameuse, Jefferies, Fall Wine, Pomme Royal, Summer Rambo, Haskell Sweet, Fall Pippin, Red Beitigheimer.

Fall, Market.—Maiden's Blush, Duchess of Oldenburg, St. Lawrence, Twenty Ounce, Washington Strawberry, Lowell, Holland Pippin, Late Strawberry, Jersey Sweet, Stump Hurlbut.

Winter, Family.—Mother, Melon, Wagner, Belmont, Monmouth Pippin, King of Tompkins County, Peck's Pleasant, Jonathan, Smokehouse, Hubbardston Nonsuch, Golden Russet, Grimes' Golden, Newtown Pippin, York Imperial, Esopus Spitzenburg, Ladies' Sweet.

Winter, Market.—Baldwin, Rhode Island Greening, Roxbury Russett, Smith's Cider, Ben Davis, Yellow Bellflower, Domine, Wealthy, Cooper's Market, Talman Sweet.—P. D. KEISER, *Carbon Co., Pa.*

Artillery Plants.—As noted some time ago in THE AMERICAN GARDEN, the most dry-boned botanist is glad to find that a plant has a good popular name, and invariably uses the popular name when it has become really popular. If they could be controlled as botanical names are controlled, there never would be a word said against them. Botanists have agreed among themselves that the earliest name as recorded in any reputable work, shall be the one to be generally adopted. We often find plants with several botanical names given in ignorance of previous descriptions or from some other cause, but as soon as an accepted name is shown to be more recent than another, that other, the older one, is taken up in place of the more recent one.

In relation to popular names there has never been any attempt to insist on priority. Indeed, the very same authority will forget its own names, and in a few years speak of something under name already recorded in connection with some other plant. A few years ago I was reading in an excellent English magazine, one that prides itself in stirring up botanical pedantry, a pretty account of the artillery plant. *Pilea muscosa* never had an English name before. We adopted it and put it in our catalogues. The same magazine is now full of artillery plant articles, but they refer to begonias now. Those who read of these artillery plants, and then send for some from our catalogue, and get a pretty lycopodium-like plant instead of a begonia, are likely to believe our firm a fraud. My stand has never been against popular names. I like them. I protest only against the immense flood of counterfeits sent into circulation with the genuine coin.—THOMAS MEEHAN.

Ambrette, or Musk Plants.—In my correspondence relating to the introduction in the South of the manufacture of pomades from odor-bearing flowers, I learned of the value of *Hibiscus Abelmoschus Muscheutos* [?—ED.] from Mr. Ungerer (Colgate & Co., N. Y.), and am thoroughly convinced that it is a valuable acquisition to sections where the garden okra will thrive. Ambrette is presumed to be hardy from Virginia, southward, but Mr. Ungerer claims to have reared, from seed sown in May, fine vigorous plants in New Jersey. It is known as musk plant, from the musky odor exhaling from the seed, and is used both by the manufacturers of perfumes as a substitute for musk, and by tobacconists to flavor the finer grades of tobacco. The supply is small and the demand is yearly growing larger. The prices paid fully warrant people in experimenting to ascertain the localities in which it will succeed. Mr. Ungerer is inclined to think that it requires much summer heat to develop in the seed the required strength of musky odor. The more heat the stronger the odor. He makes also the alluring statement that he thinks the successful producer will find in it fully as large net profits as are to be had in the cultivation of either sugar or tobacco. The seed sells easily for from 50 cents to $1.25 per pound, according to the crop.—MRS. J. S. R. THOMSON, *S. C.*

The Poisonous (?) Primula Obconica had a good start in this country two years ago, the trade doing their best to make it popular. But it was of no use, our climate in summer being too hot for it. We could not get plants that would compare at all favorably with those grown in Europe. (Of course we enter failure up to the climate account.) And if we had been fortunate enough to have excelled the Erfurt gardeners, the result would have been the same. A flower to be popular with us must be as large as a carnation, at least; as sweet as a rose, as brilliant as nature's pigments will make it, and withal, it must be susceptible of rapid propagation, something on the coleus order, which some of our leading florists can get in good shape for the auction room in three weeks from the taking off of the cuttings. We have no use for the plant that moves slow. The delicate little forms, neutral tints, the little forget-me-not or the "wee-tipped daisy," must give way to the chrysanthemum with flowers eight inches in diameter, or the rose of tea-saucer dimensions. The *P. obconica* does not belong to the show class; it must go, or rather it must not come. Surely not now, as it is said to engender a skin disease that would make the eczema a luxury in comparison. We regret the fate of this lovely plant, as we do the lack of taste for very many beautiful creations, simply because they are small and unassuming.—C. L. A.

Eyes versus Whole Tubers in Potato Culture.—The plat selected for this experiment was a dark loam, only moderately fertile, and as nearly uniform as it could be made. The Burbank variety was used, selected for uniformity in size, and cut in pieces ranging from one eye to six, the seventh row receiving a whole potato. They were planted one foot apart in drills, the rows being three feet apart. The rows were covered about two inches deep with well-rotted barnyard manure, and given level cultivation. From about May 1st until they began to ripen there was a marked difference in the size of the tops, there being a regular, upward gradation from No. 1 to No. 7, suggesting what might be looked for farther on. And, sure enough, in digging, the following yields per acre were obtained, the ground being measured and the potatoes carefully weighed:

	Marketable Tubers. Bus. Acre.	*Small Tubers.* Bus. Acre.	*Total.* Bus. Acre.
From one eye	103	29	132
From two eyes	195	40	235
From three eyes	290	40	330
From four eyes	322	44	366
From five eyes	345	80	425
From six eyes	338	102	440
From whole tubers	381	117	498

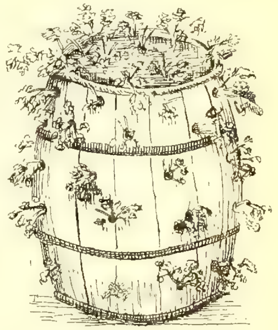
This, of course, is the result of but a single trial, on a plat five rods long. The same experiment continued next year on a larger scale and under different conditions may bring altogether different results.

Indiana. J. TROOP.

[NOTE.—Several photographs of proportionate yields in the above tests were sent by Professor Troop, and they illustrate very graphically the results of the tests.—ED. AM. G.]

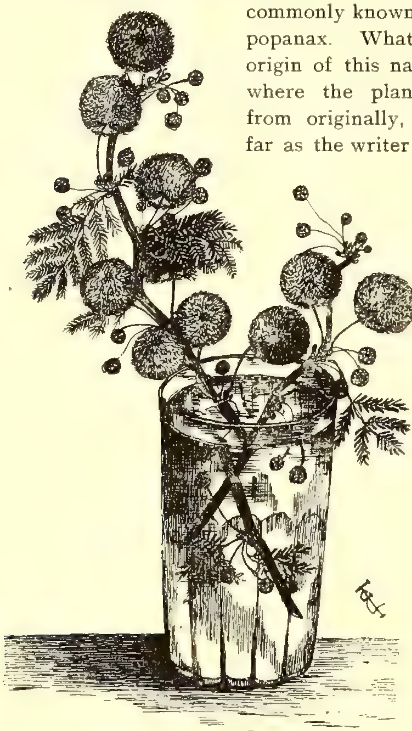
The Well Known fuchsia grower, George Fay, Lewisham, England, is said to have secured a white fuchsia—white throughout.

Growing Winter Parsley in an Old Barrel.—Relishes and garnishings that we make but little of in the profusion of summer are always welcome in winter. If our frames or glass are limited we can get parsley by utilizing old barrels or boxes. Small barrels or kegs are preferred by those who have used them. The surface is large and they are moved about with less difficulty. The best crop I ever saw grown in this way was in an old nail-keg. Parsley will stand greater extremes of temperature than most plants, but grows best if kept warm and sunny, with good ventilation. It will often do well with a moderate amount of either of these. If kept cold the leaves come slower but are just as good. Many people have a somewhat light cellar or room that they could devote to this purpose, that is now of no use. If unheated the plants will grow slowly until the warmth of the spring sun makes itself felt where they are, and plenty of leaves will grow. Bore some holes in the bottom of the kegs for drainage and then at convenient distances in the sides. Dig the old plants from the garden before the cold has killed them; then put some good light soil in the keg up to the level of the first holes, stick the crowns of the plants through the holes from the inside, and carefully cover the roots with soil. Continue in this way until all the holes are filled, and finish with some plants set in the top. A center filled in with gravel or sand facilitates watering. This is an old way of raising winter parsley, but seems known to but few people. Do not have the holes much larger than the crowns. Keep moist, but do not drown. J. B.



Law Against Killing Insect Foes.—You are certainly in the wrong here (page 432, Dec.). It is only necessary to point out the danger to convince you that the practice of spraying fruit trees is criminal. Man consumes the honey which bees gather. It follows that if the honey contains arsenic it is liable to cause death to human beings. The party putting the arsenic where bees *must* get it is guilty of a crime. There is no question about that. Bees have more rights than quadrupeds, for man can not control them. There are thousands of swarms in woods and rocks just as liable to take the poisoned nectar as the bees kept in hives by man. You will have to see this question from a bee-keeper's standpoint before you can pass judgment upon it rightly. We have laws enough now to convict any man who poisons the blossoms visited by bees. Let the sprayers beware! The first man caught spraying trees in full bloom will be prosecuted.—H. O. KRUSCHKE, *Juneau Co., Wis.*

Acacia Farnesiana in the South.—The gardens of our old city just now (Nov. 15) are fragrant with the perfume of the little golden balls of the *Acacia Farnesiana*, commonly known as Oppopanax. What is the origin of this name and where the plant came from originally, are, so far as the writer knows, unanswered questions. Webster describes a plant by this name, but not belonging to the Acacia family, and this has misled many people into calling it a Persian shrub. It has been asserted that it will grow only in South Carolina, and in only three places there—Charleston, Beaufort and Walterboro. If this be a fact, it is a most singular one, and certainly deserves investigation. Should others succeed in making it thrive elsewhere, they will find themselves amply repaid in the possession of so charming a shrub. It has the distinguishing marks of the acacia family; foliage delicate in color and texture; blossoms, crowded masses of fluffy golden stamens. The perfume is like that of no other plant, in our country at least, delicate, delicious and wonderfully persistent. This should make it of great value to perfumers. It blossoms freely all through the fall and early winter months, and will stand a fair amount of frost and cold. Any further information on the subject would be welcome to many readers of The American Garden in this city.—"K.," *Charleston, South Carolina.*



Sprig of Opopanax

The Novelty Crop of 1889 will undoubtedly be the largest one ever produced. There has been great activity in all departments of horticulture during the past year, and it will show in the catalogues. These catalogues should afford profitable reading for the cold days that are coming.

What! An English horticultural paper says, "It is calculated that during a London season the average amount of money spent daily in flowers is $25,000, most of which also goes to foreign flower growers, thanks to our wretched climate and our neglect in the matter of cultivation." This is a strange statement to make, and may be taken with many grains of allowance. In fact, we think the writer must have attended a meeting of the Unsuccessful Gardeners' Club the previous evening, where failure is always attributed to the weather, or some other cause entirely beyond the gardener's control. We have no right to speak for England, and know the florists there have much to contend against in the way of weather, but we can truly say from what we have seen that "neglect in the matter of cultivation" cannot justly be attributed to the English gardener.—C. L. A.

Try the Vegetable Novelties.—I have experimented with many vegetable novelties in the past few years, with an experience of many disappointments and pleasures. But as I buy novelties in small lots, planting a few seeds of each, the losses have been slight and the knowledge obtained is well worth the losses. Of the novelties tried in 1889, I am well pleased with the Dwarf Champion tomato. I found it the earliest; fruit smooth, free from rot and cracking at the stem; plant a fine robust grower, requiring but one square yard to grow in. I think it will yield as many dollars per acre as any other variety.

Golden Queen is a fine yellow tomato, but does not sell as well as red tomatoes on account of its color.

In beets I have yet to find something better than the Eclipse.

Of the pole beans, Dreer's or Henderson's Golden Cluster Wax are all that can be desired, coming in about ten days after the early bush varieties. Yosemite Wax (bush) is a promising variety as it is almost free from rust.

New White Box is a fine turnip radish, especially for stony land.

Of the celeries, Kalamazoo is no better than some of the older kinds.

The Sibley, or Pike's Peak squash, is of good quality; a good yielder, but a poor keeper.

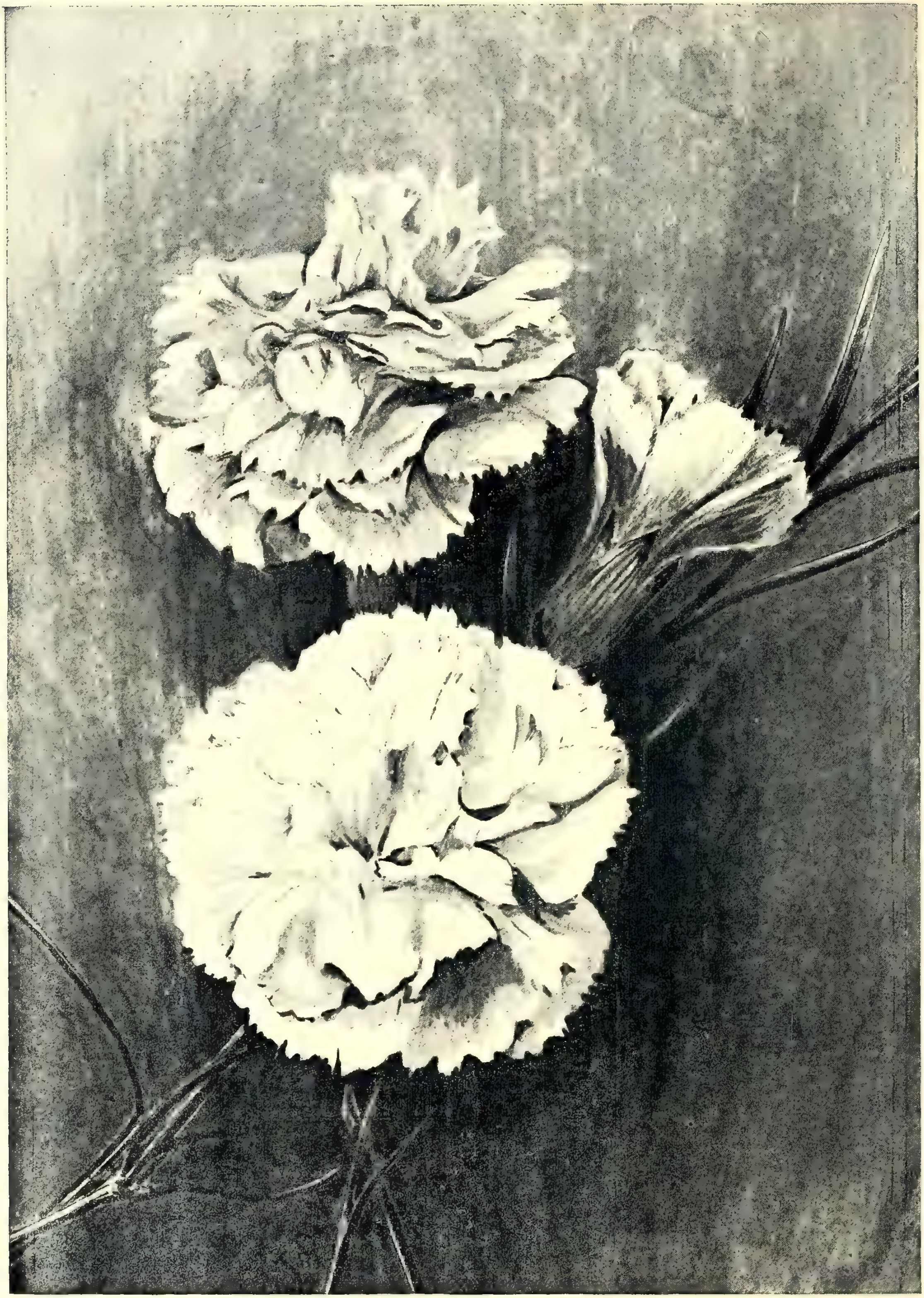
The Mammoth Sandwich Island salsify did no better than the common kind.

The Guernsey parsnip is a great improvement. Ruby King peppers are too late; for our cold climate, I prefer the Bell or Bullnose. Child's Celestial is a very pretty pepper, but I cannot find any use for the fruits.

Among early potatoes the New Queen is a good yielder of good quality.

In melons, Hungarian Honey is the finest watermelon I ever grew. Emerald Gem is a good muskmelon but too small.—John Jeannin, Jr., *Renssalaer Co., N. Y.*

Have You protected your hardy plants yet? Your lilies, hyacinths, narcissus, and, in fact, all your border plants? If not, why not? Why suffer loss, when it can be prevented? Attend to it now.



A New White Carnation, Jennie McGowan; Natural Size.

The American Garden.

Vol. XI. FEBRUARY, 1890. No. 2.

LOOKING BACKWARD.

FROM A TIME WHEN AGRICULTURE HAS BECOME A BETTER HORTICULTURE.

YOU ASK me to put on my seer's cap, transport myself to the glorious future that Edward Bellamy prophesies in his now celebrated novel, "Looking Backward," and paint the fields and pastures as they will then appear. While I am about it, is it not just as well to use a telescope as an opera-glass, and precipitate the reader into the forty-ninth instead of the twenty-first century? Then we may truly hope to see the foundations of government and of society based upon truth and justice, and life's possibilities realized to some extent.

My cap is on: I see, as through a glass, darkly at first, but the outlines gradually strengthen; the films of shadow and of gray light separate into seashore, river basin and prairie; cumulous balloons, glowing with sunshine, settle down into broad-based mountain ranges, and great cities sparkle wherever the highways of communication make cross-roads. This is Continental America, a true Democracy, where The Government is only another phrase for The People—where The Government *is* The People!

A population, vast beyond the dreams of the nineteenth century, now covers the continent. River banks that the beaver once overflowed by his engineering feats are now populous with towns; every town of old has become a city, every city a metropolis, every metropolis a cosmopolis—with its every human dwelling and workshop a little city in itself, towering to the sky.

And the fields, the pastures, the grain prairies, the woodlands—they are still here, although scarcely recognizable. To support a population, whereof every thousand of old represents a present million, and where every unit of this million now lives in comfort and plenty—this means myriad changes in methods of production and distribution. There are now no waste places; nature never wastes, and man has learned to take nature at her best and conform his ways to hers. Horticulture has supplanted agriculture, and every acre is studied and stimulated to do what it best can do, just as every man is expected to exert his best faculties in his most suitable field of action.

Whatever is produced is preserved, for waste is recognized as a form of wickedness that must mean want to some one, even if the waster himself is exempted from the inevitable penalty. Every berry, every fruit, however perishable, is promptly submitted to the improved processes that chemistry has taught, and so prepared that it shall be ready for future need. The waste of past ages constitutes the riches of the present era, and fills to overflowing vast storehouses of food products that now gird the globe and prevent all possibility of hunger.

The problem of transportation has been solved. No one center is allowed to become overstocked with the world's goods at the expense of less favored outskirting provinces. Where the need is, there fly the needfuls. Railways, and road vehicles propelled by power, now net the land; while the seas are highways over which processions of electrical ships bear their brimming food-baskets. Thereby, the Grand Council of nations is able to deal with the globe as the market gardener of old did with his garden plat; whatever corner is best suited to a certain product, that corner is devoted to that pro-

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duct and to that alone. Africa is now the world's hothouse, and the scent and flavor of its fruits make glad every table in the world; while the grain fields of the north return their appropriate quota. The luxurious wastefulness of constraining nature to half-do things, out of latitude and out of season, is no longer practicable.

And man, what has become of man in this process of revolution? He has simply taken his proper place in nature's beneficent plan. He is no longer a beast of burden. He works still—works more industriously than ever before, but he works hopefully, manfully, as he was meant to work—with his brain as well as his back, as planner and director, rather than as a brute force. He works intelligently, with agents that he understands, and in the direction of assured results, so that every stroke counts. He has trained the forces of nature to do his brute work. He has even taught them to relieve his brute companions of a large part of their work. Oxen no longer painfully drag the plough through stony ground; horses no longer pant under thrice normal loads. Steam and electricity and motive forces whereof the nineteenth century had no knowledge, now form the muscles of the world's arms, and catch their power from the tides and the winds. Man has ceased battling with nature, and taken her into willing co-partnership. Her weed pests and her insect pests have either been yoked into service, or left no opportunity for propagation. So-called accidents of nature are no longer complained of, but from them her laws have been codified. Knowledge has became power in its broadest sense.

And pleasure—has that any part in the scheme of the forty-ninth century? Aye! to an extent that the nineteenth century knew not of; willing work, in fields fitted to the capacities of the worker, is of itself one of the highest forms of pleasure; and the absence of all fear of future want, for himself or his family, affords that contentment and peace of mind that alone can give to leisure any possibility of pleasurable recreation.

The experimental age has past; the age of realization has come; the earth blossoms like the rose, and man laughs in the rose-field that nature and he have together created.

George Houghton.

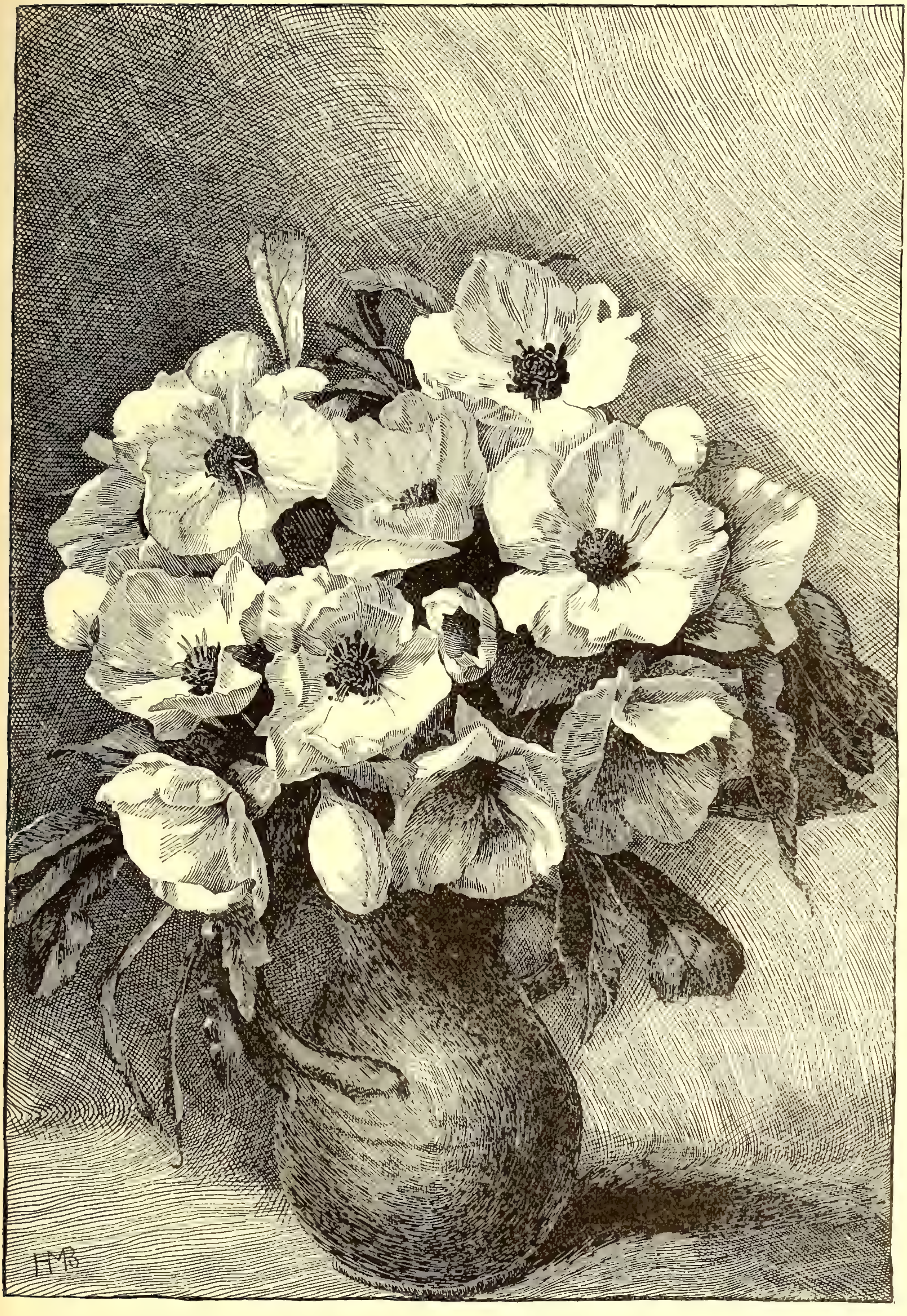
THE WILD CRAB FOR THE NORTHWEST.

This vast fertile country is dotted all over with fine native groves, heavily laden each year with strictly winter fruit, known to the botanist as *Pyrus coronaria*. That this will prove to be the richest horticultural mine ever opened up to the people of the northwest, no one needs to doubt who admits the fact that "the apple is the king of all fruits," and that winter fruit is the most desirable. I came to Minnesota to make it my home 30 years ago, and I have never known any one to attempt to hybridize or civilize the wild crab in this state. C. G. Patten, Iowa, we believe, holds the distinction of being the first man in the northwest, if not in this country, to hybridize *Pyrus coronaria*. I regret, however, that he did not select a tree from his own wild thicket to start from, rather than the Soulard, which we are informed was found wild near St. Louis. The Soulard is a failure on my grounds, while we have had forms of the same species found here, top-worked with hybrids, and standing perfectly in high open ground for the past 15 years. If our short lease of life holds good till that time "when the roses come again," we propose to hunt for the largest and best variety of the *Pyrus coronaria* to be found in this latitude. We have seen them with fruit fully as large as the Soulard crab. I should hybridize with the best of the hardy Russians. In our search for the coming winter apple we tried the common apple and found it too tender. We tried the crab and found the fruit too perishable, the plant too good a home for the bacteria. Lastly, we tried the Russian and found it the best of all, but not wholly satisfactory as to winter.

A. W. Sias, *Minnesota*.

NOTE ON PYRUS CORONARIA.

The American wild crab, *Pyrus coronaria*, is one of the many neglected wild fruits of this country. It varies considerably in its wild state, and some of its variations make tolerable fruit for late winter and spring use. The fruit usually keeps well when buried. In the early days in western Michigan we knew of this fruit being gathered regularly every fall. It was buried, and by March or April all the bitterness and acridity had disappeared. It is sometimes used for preserving and cider. It has not yet been cultivated for its fruit, but a double flowered variety is grown for ornament. It does not blossom at the same time as the apple, and experiments in hybridizing are therefore complicated. The species inhabits copses from the northern shores of Lake Erie to Maryland and southern Minnesota, extending southward to Indian territory and northern Louisiana, and following the Alleghenies into Alabama. —Ed. Am. G.



Christmas Rose (*Helleborus Maxima*); from a Photograph sent by E. L. Beard, Cambridge, Mass.

TWO METHODS OF GRAFTING.

The season for indoor grafting is upon us, and the discussion of ways and means is now in order. I venture, therefore, to call the attention of the readers of The American Garden to a comparison of two methods—the one an old one in universal use, the other not a new one, but employed by few propagators. They are the whip-graft and the veneer-graft. There is an essential difference between the two methods. The whip-graft is so generally known that a description is unnecessary. A reference to Fig. 1 will explain the veneer-graft: A shows the cuts upon stock and scion; these cuts are not to extend into the wood, but simply through the back, so that when placed in position the exposed broad surfaces of cambium come together; B shows stock and scion in contact, and bound with raffia or other material; C shows a veneer-grafted apple tree after one season's growth.

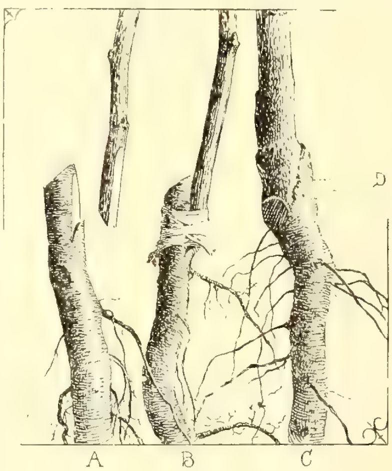


Fig. 1, Showing Grafts.

It seems almost unnecessary to remark that in grafting, when cut surfaces of hard wood are placed together no union takes place between them, and yet I have not unfrequently met practical men, who could graft well, who were not clear on this point, but supposed that union took place over the whole cut surface. It is in the cambium and young sapwood, and there only, that the power of union and growth lies.

Now, in the veneer-graft, the only cut surfaces of wood are the oblique end-cuts, and as stock and scion are placed together, the oblique cut on the scion is covered by the tongue of bark on the stock, so that if the work is well done union takes place all around the cut wood, and it is securely protected from outside influence. The oblique end-cut on the stock being surrounded by growing tissue is usually imbedded in new growth the first season. The union between the side-cuts, which should be of the same width, and from an inch to an inch and a half in length, is complete throughout. This I have proved by making transverse and longitudinal sections of a large number of grafts. A portion of one of these transverse sections, taken from the point D, Fig. 1, is shown in Fig. 2. It was photographed from the microscope, and is magnified twenty-five diameters. The stock appears on the left, the scion on the right; the space between the woody parts is filled with a homogeneous growth of new tissue, and this extending throughout the length of the cuts insures free communication between stock and scion, and also gives a strength able to resist heavy strains from winds or other causes.

In the whip-graft we have large surfaces of cut wood; all the cuts extend through the wood. We depend for union upon the contact of a very narrow line of cambium. This line is a long one, it is true, but in very many cases it is not all available. If the scion is smaller than the stock we get union only on one side. If they are of the same size we are still liable to have some points in its extent, where from irregularities or inaccurate cuts we get no union, and these places serve as points of ingress for moisture, which induces decay in the dead tissue of the cut wood surfaces. Fig. 3 is a portion of a transverse section of a whip-graft after one season's growth, taken from the same relative point D, as noted in Fig. 1. It was made in the same way, and has the same magnification as Fig. 2. On the left we have the scion next to the tongue of the stock, then the tongue of the scion, and on the right the body of the stock. The white spaces show the extent of the cut wood surfaces which have not united. New growth has taken place on both sides, and in the upper left-hand corner new tissue is wedging itself into the space between the scion and the tongue of the stock.

When the section was made these spaces were filled with granular particles of decayed wood, and a longitudinal section showed this to extend over all the cut wood surfaces. I have examined a number of whip-grafts after three and four years' growth, and have found that even when the exterior growth all around the graft was smooth and regular, there still existed this accumulation of rotten wood along the cut wood surfaces. Now, the question arises, Does this "ulcer of the heart" often or ever extend so far as to affect the vitality of the tree?

At the gardens of the Royal Horticultural Society at Chiswick is a collection of graft sections taken from trees 30 and 40 years old. According to Mr. Murray, these sections show plainly that this rot does extend, and in many cases to a presumably injurious degree.

In my own observations, confined to trees three and four years from the graft, the larger number of cases showed but slight extension of this rottenness. In a few cases it had considerably advanced, and in two cases had reached a positively injurious extent. We do not, however, expect our grafted fruit trees to live forever, and it may be that the occurrence of real injury from the source in question is too rare to be taken into account, so I do not wish to be understood as utterly condemning the whip-graft. If I have said enough to induce further observation among those who have abundant opportunity, I shall have accomplished my purpose.

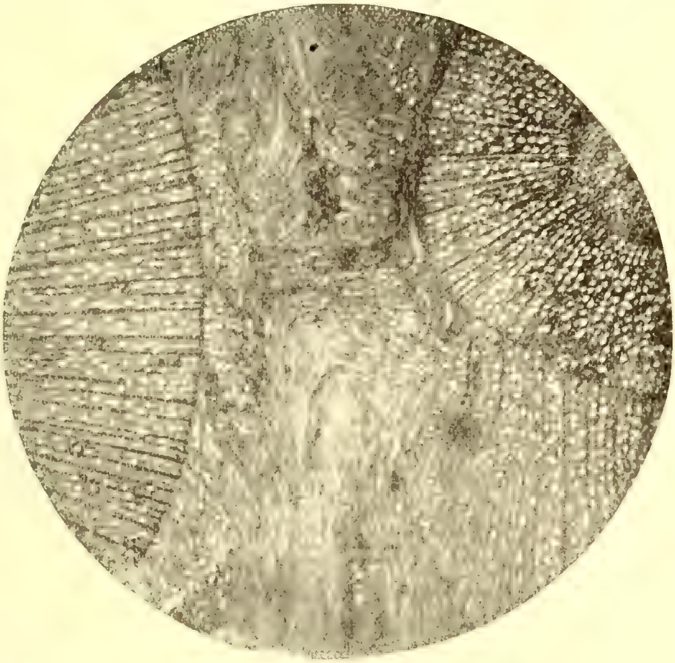


Fig. 2. Microscopic Section at D, Fig. 1

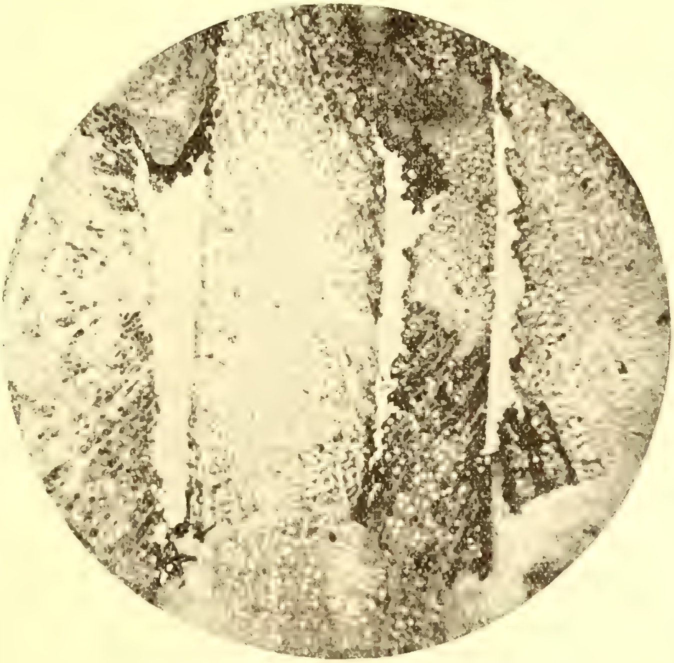


Fig. 3. Microscopic Section of a Whip-Graft.

A word further may be given concerning the veneer-graft. The cuts are easier to make than those of the whip-graft, but there is this disadvantage, which to men who graft in quantity is an important consideration, that it requires more care in the tying. The band must be strong, and should be firmly adjusted, to insure keeping the scion in place until union is effected.

All my sections show that very perfect union is obtained by this method, and I would particularly recommend it for grafting all ornamental trees. Any extension of the decay spoken of as possible in whip-grafted trees must tend to weaken the tree at, or just below the surface of the ground, the very point where greatest strength is needed. With our ornamental trees, which we expect will live or thrive indefinitely, and many times in exposed situations, this liability is worth consideration. It need never arise from a well-executed veneer-graft.

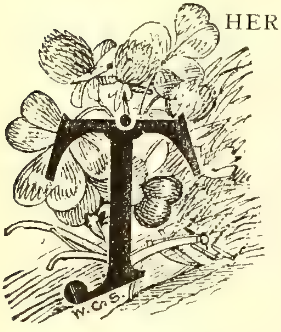
I have practiced the two methods spoken of, and have had them under comparison for four seasons, and am more and more inclining to preference for the veneer-graft. The reasons for this preference seem to be based on the fundamental differences here explained.

E. S. Crandall.
Michigan.

TARRYTOWN LETTERS.—IV.

BY A. B. TARRYER.

MORE ABOUT GRASS—MRS. TARRYER GOES TO THE CONNECTICUT FARMER'S MEETING WITH HER KNITTING-WORK AND GETS SOME NEW-OLD MATTER TO TELL HER BOYS.



THERE is now a growing curiosity about grass-seeds. They do not reproduce individual plants precisely and radically as roots do. Seeds vary a little by degeneration year by year according to their environment, but that gives opportunity for selection and makes life more interesting and hopeful for the vigilant cultivator. If we care for the exact roots of a grass it is only necessary to see what we want in the broad page of the world's surface, and propagate that. Though seeds are lighter, nicer and easier of transportation than grass-roots, it is easier also to be mistaken and get cheated with seeds. This liability increases the chances of variation beyond what is pleasant sometimes; so Mrs. Tarryer believes that people should save their own grass-seeds, when they have any right good ones.

She went down to the Annual Farmers' Meeting of the Connecticut Board of Agriculture at Birmingham, in December. It is a sort of a feast of the passover for her. Having been born in the Nutmeg state, and living several years while she was young, in Rhode Island, she meets many old friends and acquaintances among those antique board-around teachers, and she likes nothing better in the whole year than to take her knitting-work and sit among a parcel of grey-headed old farmers and hear them talk.

Since young scientists, fertilizer-men, grangers and their wives have begun to muster strong at these meetings, along with whatever local gardeners and rural politicians are attracted to the annually changing base of operations, these grand yearly gatherings have become doubly interesting.

Secretary Gold is a veteran caterer for the intellectual farm life in the new theology to be called the mother of gardening. He devoted a whole forenoon to roses, to the great astonishment of by-standers. He always manages to have a fast and lively programme, which he drives through like a valuable steer team bound home along a rocky and bushy road. There is plenty of time for discussions, and a free question-box to invite them. The talk gets pretty hot sometimes, but farmers have a native dignity and love of order (each being a little king in his own right), so there are never any rows, such as we hear of in almost every other sort of meeting. Latterly Mrs. Gold brings in music after each act; this empties our minds of deleterious matter, furnishes a soft packing for what is best worth saving, and a fresh basis for storage. So we go on through a protracted jam of mental fodder, which completely turns our livers over, so to speak, and sends us home with enough to think of for a year.

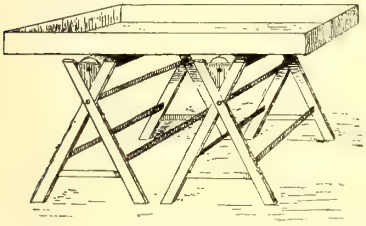
When Mrs. Tarryer found Charley Potter, the grass-seed grower of Prudence island, was given a choice place in the bill of fare for showing how he cleans his fine grass-seed for market, she was bound to be there and see him do it, so as to be able to tell her boys how it is done.

Her fixed idea is that women are the mothers of industry and that nothing goes right which they don't have a thoughtful hand in. More women are of the same opinion than are always willing to own it, which is just as well as long as they think so, for we are often moved to best advantage by powers we are least conscious of.

Mr. Potter is a bright, plain farmer, tilling his 400 acres of rented land according to ancient recipes, with cattle, horses, sheep and hogs. He has a number of specialties besides that of growing the fine "peasant" agrostis seed, known by the trade name of "Rhode Island Bent," and counterfeited by common tall "Red-top"—now coming to be more of a grain than a forage-plant.

Fine agrostis is nearly "as old as the hills." Varieties of it are scattered in thousands throughout the north and probably in the south temperate zone. "British" botanists, in sorry league with city seedsman, the rack-rent landlord and the skinning plow declare these various forms of agrostis "no use to agriculture." But yeoman and "statesmen," farmers, graziers, gardeners and the conservators of the land among all free races of men for ages, know the finer varieties of agrostis, under one name or another, as famous bottom-grasses for green meadows, solid sward for pastures and the sunniest fine verdure in open door-yards and lawns. "R. I. Bent" is "a good mixer," as they say out west, and so it lives in spite of neglect. But Mr. Potter is about the "last of the Mohicans" to grow this seed—singularly clean of others—for sale.

This island seedsman needs no naturalist to tell him that the turfing habit in a grass (like many other precious habits in vegetable and animal life), though fixed, *still needs perpetuating in the conditions which produced its virtues, to preserve them.* Hence he keeps sheep to trim, tread, manure and weed the green sward of his seed-pastures and meadows, as a long line of "Bent" growing ancestors did before him. Mr. Potter is that rare kind of a fine grass-seedsman whose exact science is inherited and traditional. He is actually living in the pastoral age whereof devoted city lawn-makers desire to preserve lovely turf-emblems! He made a very pretty appearance on the little opera-house stage; seemed as much at home there as if it had been his own barn-floor; and as he was wise enough to bring Mrs. Potter with him, so as to satisfy all reasonable social curiosity, the thousand questions fired at him by the audience only spoke the interest growing everywhere respecting grass-seed. The staff-writer of an eminent metropolitan journal (which gave an excellent report of the meeting) was so warmed up by the excitement of the occasion, as to confess, in private, that he wasn't aware before that grass comes from seed. Such are the victories of peace!



Mrs. Tarryer thought the whole scene worthy of a great historical painting, but our dabsters are not yet up to such a radical renaissance of agriculture and gardening. She finally begged a willing young woman of her acquaintance to make the accompanying sketch of one of the sieves, and the stand (a simple frame with four legs would hold the rollers just as well), used by Mr. Potter on the platform. His bags of seed, in the chaff, looked like the dust of home-lot hay-mows. Passed through two sieves—4 by 2½ feet—the first wth a mesh of 24, the second with 28 spaces to the linear inch, a product of golden-yellow agrostis seed—fine, light and silky—was the result. "Heavy Bent seed means *dirt* and foreign seed," said Charley Potter. "That last sieve will take out white clover."

So much unclean seed is grown that trade is forced, at present, to advocate "mixtures," even for the choicest artificial grass-plats. Every observing seedsman knows better, but is helpless in the general stupidity. Till the public awakens to the folly of its ordinary practices, small lots of choice seed in the hands of great seedsmen will only be lost in their "mixtures," like nice cream in co-operative dairying. Mixed seed for weedy meadows and pastures is not so entirely reprehensible, but to mingle "Potter's Bent" with anything else for pure domestic purposes would be to waste it. "Sow my seed alone," he said. The finest sward for lawns everywhere is the purest one of whatever grass composes it. Mixtures of seed render a perfectly uniform sward as nearly impossible as the seedsman can make it.

The little rig pictured does not represent the complete horse-power thresher and separator Mr. Potter has adapted to his considerable business at home, but the sketch gives a sufficiently accurate notion of the simple contrivances used on the stage, and all that is needed by beginners in saving small lots of seed. Out of careful experiments widely extended, we may hope to grow an American grass-seed production for use and trade in the near future, whereof we shall not be ashamed.

Mrs. Tarryer was delighted with every feature of the meeting, but she was seen asking a grey-beard, if we were not "rather previous in paying so much attention to microscopic things—fungi, bacteria and so forth—while not a man of you could have crossed the street into Birmingham Green and give the right names to one of our common grasses!" Her idea is that instead of sowing seed for sward of whose sward-making qualities we know nothing, we should save seed from the grass that has shown itself able to produce precisely the sward we approve. There is a world of "service-reform" in it.

A LITTLE PLACE IN THE COUNTRY.

FIRST DAYS OF 1890 IN THE GARDEN—STARTING THE HOT-BEDS—SOWING THE SEEDS—PROTECTION—WATERING—METHODS WITH THE DIFFERENT VEGETABLES—OUT-DOOR WORK—IMPLEMENTS.

Seventh Paper.

WITH the beginning of February we commence to look for signs of returning spring here in the middle latitudes. During the months when snow and ice have kept the secrets of the soil locked up, we have waited, with what patience we might, and planned against the coming of this time. Now, on these first bright days, when we can see the effect of the sun's warmth upon the earth, we are anxious to be out and at work. But the frost is not out of the ground yet, or if it is, has left behind a moist and sticky condition that prohibits as yet any horticultural efforts. Under such circumstances we turn naturally to the hot-beds, of which we made the frames last month, and here shall find an escape for all of our superfluous energy. Before the harvest can be reaped the seed must be sown, and before the seed is sown the bed must be prepared. The initial work with the hot-bed this month is to secure just the right sort of manure and put it in the bed properly. If horses enough are not kept upon the place to furnish the requisite amount of fresh manure, it will be best to arrange with a livery stable to have the product saved for a few days before it it is wanted. It should be saved under cover, and not piled so that it will heat. If left for more than a few days, it will be best to inspect it personally, and if found to be heating turn the pile over with a fork. When a sufficient amount has accumulated, choose a warm day, when you can work out of doors without discomfort, and begin operations. If, as suggested in a previous paper, the bed was filled with refuse in the fall, throw this out, so that it may be used for additional protection about the frame, leaving a layer of only a couple of inches at the bottom to keep the fresh manure from the cold ground. Now throw in the manure, packing it down constantly until it is a foot deep, level, well packed in the corners and along the edges, and as solid as it can be made. Upon this fill in soil to a further depth of six inches. Too much care cannot be used in securing this to have it of proper quality and free from weed seeds. If it was not secured and stored under cover in some available place last fall, trouble may now be experienced in getting just what is wanted. The soil should be a rich loam. Clay is difficult to keep in proper mechanical condition in the hot-bed. It must be dry enough to handle well, a difficult condition to secure at this season, when the surface freezes at night and thaws during the day, and must not come from weedy ground, as the weeds will start ahead of the seeds and make much extra work. The best place to secure the right soil is in the woods. Go into the fence corners, or into the hollows, where the leaves blew knee deep in the autumn. Rake the now decaying leaves aside, and you will find beds of fine black soil, which has been protected by its covering from freezing, and which by the same protection has been kept free from weeds.

After the dirt has been put in the bed, rake off smoothly, but leaving the surface inclined a little toward the front, put the sash on tight, and leave it for a couple of days for the first violent heating to subside. Then sow the seed (this first bed should be used for lettuce) in drills eight inches apart. The drills may be easily made by pressing a lath down edgewise in the soil, and covered by laying the same implement flat and pressing it down again above the drill. The seed must be sown more thickly than we expect it to remain, as some will not germinate, and some plants may be wanted for transplanting in the open ground. Lettuce seed is very fine, and it is difficult to sow just right. Aim to have about three seeds to the inch of drill. If they all germinate they can be thinned out easily as soon as the shoots appear above ground.

After the seeds are started, if the bed has been well prepared, and frame and sash are tight, the beginner may have some difficulty in regulating the heat. The trouble will be, not in keeping up a sufficient amount of heat, but in keeping the bed from getting too hot at times and in maintaining an even temperature. Too much heat will produce a quick, slender growth, which will be difficult to develop into a good plant, and which will be more susceptible to injury than a stockier plantlet would be.

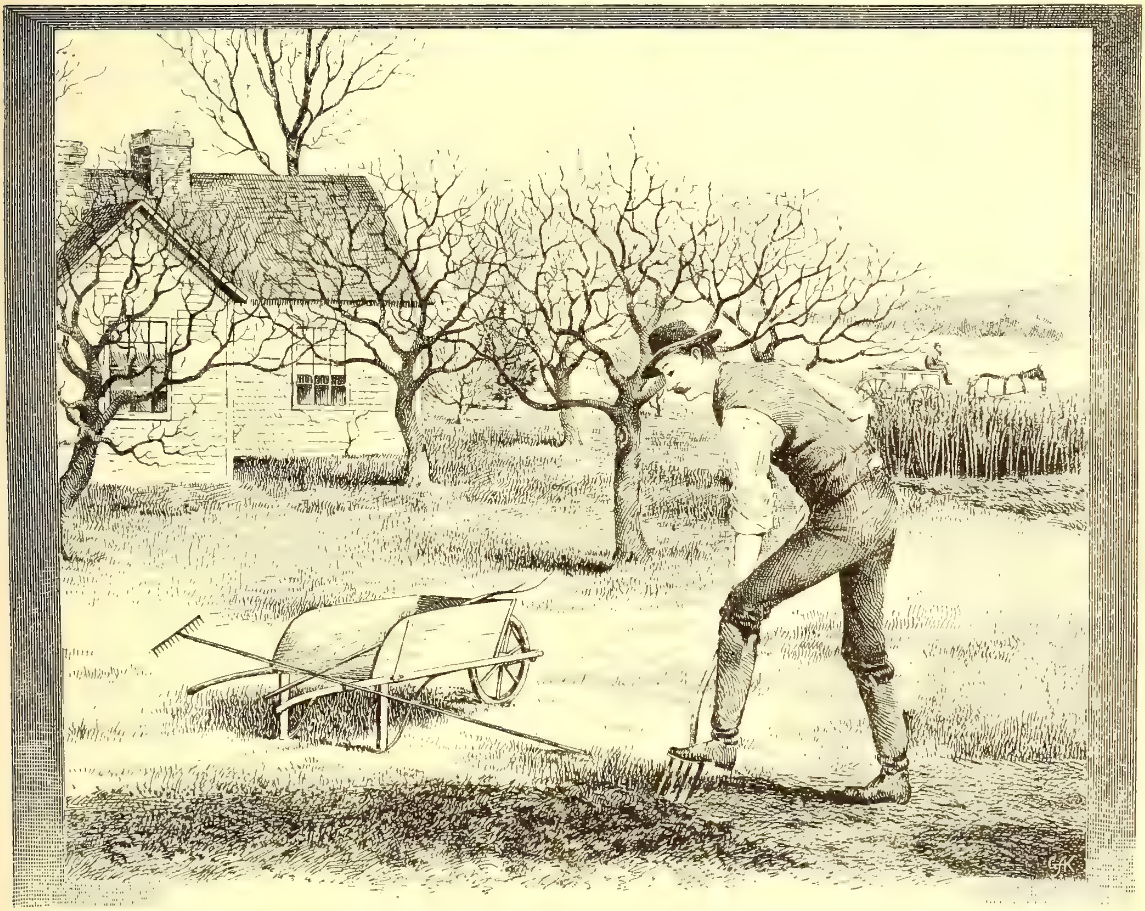
At night the bed must be covered tight. In the morning it should be examined the first thing, and if there is much steam or undue heat the sash should be raised a very little and kept up until the excess escapes. The bed may not be opened in the direction of the wind, as when the plants have been in such an atmosphere over night they would be very easily injured by a frosty breath. As the season advances, and the rays of the sun generate greater heat beneath the glass, the sash may be kept up a little while in the middle of the day, but should be closed early enough to secure and store sufficient heat to last through the night.

By carefully watching this first bed for a few days, noting the germination of the seed and the starting and growth of the plantlet, much useful knowledge regarding the details of hot-bed management will be acquired. Thus it is best to prepare this first bed as early as possible, and use it as a basis of study for the future work.

One thing that must be borne in mind is that the sun will speedily exhaust all the moisture naturally contained in the six inches of supplied soil, and that no moisture can be drawn from the ground beneath on account of the intervening mass of manure. So water must be regularly supplied to the surface, and it should be done by a hand-sprinkler having a very fine rose, so that the ground will not be made wet or heavy in places.

The work of preparing the beds and sowing the seeds of the different sorts of vegetables is practically the same; but their succession must be determined by the relative time at which the plants may be set in the open ground, as well as upon the length of time required for the germination of the seed. Thus, lettuce may not only be put out earlier, but it is slower to start than cabbage and cauliflower; and if tomatoes should be started at the same time as the latter, they would be too large to handle by the time the season was far enough advanced to put them out.

In handling the beds, too, after the plants are



Getting Ready for Some Early Things in a Sunny Spot.

started, the peculiar needs of each must be studied. Cabbage will stand a degree of cold that would ruin the tomato plants, and while the latter must be more carefully protected, they may be easily killed with kindness. They will stand almost any amount of heat if sufficient moisture accompanies it; but let the bed become both hot and dry, and the warm sun of a late April afternoon will soon put them in a sorry plight. In order to make the plants hardy and able to endure exposure when planted out, all the beds should be given as much air as possible whenever the days are warm enough to permit raising the sashes a little way.

Radishes in particular, if tried under glass, must be kept moist and cool, approaching as nearly as possible to the normal condition and temperature of the open ground in May. If too hot and dry they will run up to stalk, leaving the root tough and pithy.

As the season progresses, and day by day we find that it is growing a little warmer and the soil growing a little dryer, in some favored spots dry enough to work it will be difficult to keep our hands from the hoe and the spading-fork—more difficult, perhaps, than it will be three months hence! To relieve this uneasiness there are a few things that we may do very early. Among the first of these is to make an onion bed. This may be done as soon as it is possible to work the soil, and both seeds and sets planted. Subsequent cold weather, or even the slight freezing of the ground that may ensue, will do no harm.

As the pressure of time will not be felt so much now as later on, let us do this first work thoroughly and without regard to the amount of labor expended upon it.

In the first place, we will not think of the plow yet, but will rely upon the spading-fork for preparing the soil, and without regard to the question as to whether we shall have enough manure to cover all our land at the same rate, we will put on this piece just as much of it as we can work under. The manure pile must be worked over with a fork, and all coarse stuff, stalks, long straw, etc., thrown out, as we want nothing here that will be in the way of the teeth of a fine rake. When enough has been culled out and torn up fine with the fork, wheel it to the desired spot and distribute it evenly to a depth of say three inches. More would be better, but this is as much as can be well worked in. Now spade the ground up as deeply as the fork can be driven, breaking it up and raking off at the same time, leaving it smooth and mellow, and the surface as fine as a steel rake can make it.

Sets must be planted to secure early green onions for the table and for market, as the seeds are slow to start and will not make edible bulbs before early summer. White bottom sets are best, and the largest ones should be sorted out and planted by themselves, as they will be the first to get large enough for use. By planting these separately they may be gathered the more easily, and that portion of the bed cleared quickly and put to other use.

A garden line should be used in planting all beds, and the rows made absolutely straight and at equal distance from each other. With the rows twelve inches apart the conditions of economy of ground and facility of cultivation are best harmonized; the sets should be pressed down well into the loose surface soil, with the thumb and finger, about three inches apart along the row.

If intending to furnish a supply of green onions for market, not less than a half-bushel of sets should be planted. These would occupy about one-sixteenth of an acre of ground, or say a strip 25 feet wide by a little more than 100 feet long.

I would not advise a beginner to do more than experiment very slightly with growing onions from seed. To attain any degree of success, every condition must be most favorable; the land must be rich and free from weed seeds; the crop must have careful attention from the time the little green loops appear above the ground until midsummer, and the work required is of the sort that demands the utmost patience to accomplish successfully. But if one wishes to experiment, let him sow a few rows of the bed, putting the seed in by hand, two or three to the inch, and cover it very lightly indeed with fine soil. As onion seed is slow to start, it is well to hasten its germination by soaking in tepid water for a day; then dry it off, so it may be separated easily for sowing. A garden drill may be used for these and other small seeds, and should be among our stock of implements; but at first I would advise sowing a little by hand, to become familiar with the quantity of seed needed and the depth at which to cover, etc.

Onion growing from the seed is one of the most profitable branches of horticulture in which one having only a little land can engage. But there is none in which such discouragement is apt to come to the beginner as will prohibit any second attempt in that line, and the most prolific cause for such discouragement is in attempting too much in the beginning.

J. K. R.

METHODS OF MARKETING.—III.

GOOD PACKING—PROPER GRADING OF PRODUCE—TRANSPORTATION—EARLY MARKETING IN NEW YORK.

GREAT as is the difficulty in having standard packages, the size, shape and capacity of each to be governed by a United States law, as was suggested in our last paper, we note a disposition among the handlers of produce in the New York markets to take this law into their own hands. In brief, we were given to understand that a movement was seriously considered which would force the grower to send his products to market in proper packages. While this movement, to be a success, would require close combination among the dealers, which would be hard to secure, it shows plainly that men who are in a position to judge, feel how serious is the situation. It is, however, worthy of note that the best and most progressive growers have long understood the situation and act accordingly; this fact makes still more exasperating the strong disposition toward getting produce to market in any shape so long as it gets there, which is too current among the majority of growers.

The question of the division of qualities is so important that at the risk of seeming repetition I desire to particularly emphasize the point. In the question of an aggregate profit resulting from the production of fruits and vegetables, that of quality is most important. Our nurserymen, seedsmen and florists have recently claimed that their several businesses have reached a point where it will be "the survival of the fittest." They come to this conclusion by reason of the strong disposition among some of them to make sales at any cost, and usually this cost is borne by the purchaser. Goods sold for less than their value must be inferior in some respect. These tradesmen have the advantage of the fruit and vegetable grower in that the customer does not see the goods until after he pays his money so the result is simply the loss of a customer.

In the case of the fruit grower then, quality counts more largely than almost any other point in his business. There has been so much talk about the miserable livelihood to be obtained from the production of fruits, that it is almost impossible to make people believe that there is even a living to be obtained in the prosecution of this work. And yet it is evident that by hard, earnest, careful and intelligent work a competence may be obtained in the culture of fruits and vegetables. As a matter of fact the quality of the fruit bears no unimportant part in the successes of fruit growers; we do not mean to be understood that when referring to quality, the edible quality of the fruit is meant entirely; for, unfortunately, the grower has not to cater to the palate of the consumer, but to his eye. Berries, or any other fruit of handsome appearance (good color, form and size) no matter what the quality may be, will command a price in market far in excess of that brought by fruit of good quality and unattractive appearance. This is a strong statement, but circumstances warrant it. Of course there are exceptions to this rule, as when the consumer becomes acquainted with a variety and it suits his eye and taste, the latter especially, it will be bought in preference to all other varieties. Take for example the Shaffer raspberry; it is unattractive in appearance, being of a dirty purplish hue, yet we never knew one person who had tasted it but what wanted more. The quality is superb, but it is almost impossible to sell it in any market where not well known.

GRADING.

The more successful gardener and fruit-grower, as a rule, is the one who carefully grades his produce. It is sometimes claimed that produce marketed as harvested, good, bad and indifferent, will bring more money in the aggregate than if sorted into numerous grades. This is pure fallacy, as a visit to the metropolitan markets would convince the most skeptical. It frequently happens that a lot of stuff is brought in from the plantation, which if shipped to a market 50 miles from where grown is there only second class and sells accordingly; while if this same stuff were taken to a home market it would bring a good price. Here again does our point against mixing varieties come in. Soft strawberries in the same box with firm varieties, even if of a better color, will have the effect of reducing the net amount received for the shipment. Of course it would hardly be good economy to lose the second grade of fruit rather than take it to market. In such a case successful growers have two sets of packages different in appearance. The packages for the second grade of fruit are neat and attractive, and have a private mark which the commission man will understand as meaning that the contents are second grade. Oftentimes a good price will be obtained for this second grade fruit, especially if it should reach the market when fruit is scarce. Good packers make this second grade of fruit look attractive by the pains taken in packing and arrangement. We have seen a half-dozen crates of handsomely colored fruit which was extremely soft and good only for immediate use sold to a large hotel in New York simply because they were attractively packed. Anything inferior to the second grade is not sent to the New York markets by growers who understand their business, but usually finds a resting place on the refuse pile.

It is perhaps more difficult and less profitable to grade vegetables than fruit, but still it should be done when possible, especially with winter varieties. It is of course understood that in green vegetables, nothing that is specked or inferior in any way will be used. The packing of apples is an art that few growers as yet understand, for they will insist on putting in specimens that are badly specked or bruised, and as a result it is only a short time before nearly all the fruit is a mass of rot. There is no question but that careful grading is a profitable course to take, and we venture to assert that there are not a half dozen instances on record where a lot of mixed fruit brought the same good price as a similar lot sorted into two grades and sold in the same market.

METHODS OF TRANSPORTATION.

The route of shipment must of course be largely determined by the shipper, though when it is possible to choose between several routes he is able to get rates which are moderate. We are of the opinion that those who raise produce for market do not give the question of transportation rates the attention they should. Our friends of the tree, plant and seed trades combine with each other to get the most favorable rates. They are constantly fighting the transportation companies and are usually able to get liberal concessions. The inter-state law, from which so much was hoped, has given the shipper little relief. We rarely hear of fruit-growers and farmers seeking for reduced transportation rates; yet goodness knows they need low rates about as bad as any other class of people! We are aware that there are many difficulties in the way of accomplishing this purpose, but nevertheless it might be done were concentrated efforts made and persistently kept up.

When we consider that large quantities of produce of all kinds are grown within 20 miles of New York city, it may be readily seen that the grower who can cart his goods to the market has the advantage in more ways than one over the producer who depends on the several transportation companies. It is no unusual sight to find long rows of market wagons drawn up on the streets which lead to the large markets of New York as early as 7 o'clock in the evening, though we cannot see why it is necessary to reach the market so early, as one has little chance to sell to dealers much before 2 or 3 o'clock in the morning. Of course large quantities of this produce is brought in early to fill orders already given, for we see many of the wholesale dealers getting in and arranging their stock early in the evening for the trade of the next day.

The grower of fruits and vegetables distant from New York would be able to learn many valuable lessons if he could see the methods of grading and packing done by the growers of Long Island, and those parts of New York state and New Jersey sufficiently near to the city to carry in the produce by wagon. The inexperienced would see readily why their own products bring so little. Let us step up to one of these wagons. The driver, a sleepy Swede, looks at us as we lift the blankets from off his produce but says nothing. See the celery, blanched to the very tips of the leaves. The turnips look as if they had been washed. We examine a half-barrel of potatoes and are willing to swear that there is not an inch of difference in diameter between them. Next to this small barrel stands another filled with smaller tubers, yet all of these are near of a size. They are what are termed seconds, yet so uniform in size are they that they will bring a good price. Now an application of our moral: Suppose these potatoes had been mixed, would there have been the opportunity to obtain so good a price for the lot? It is easy to see the advantage of proper sorting. The entire load is thus carefully graded and, when in bunches, nicely tied. Time was consumed in doing this, but it was well paid for by the additional price received.

Many of these growers near New York occupy small plots of ground for which they pay an enormous rental, and every inch of it must be made to pay something. After they have grown the crop they fully understand that the real success of their work depends on marketing it in such a manner as to bring the highest price. They also understand thoroughly that an attractive, well-blanched bunch of celery will bring a better price than a bunch half-green and dirty. They know too that the people who buy produce in the metropolitan markets to sell again thoroughly understand what the consumer requires, and he also knows that the consumer in such a city as New York well knows the difference between good and bad packing of desirable or undesirable products.

Illiterate, rough and coarse, these people understand thoroughly their work. If our more intelligent growers of market products would use their intelligence to better advantage the results of their work would be much more satisfactory. In our next paper we shall invite you to go with us and see how a famous fruit and vegetable grower handles his produce for this great market. K.

(TO BE CONTINUED.)

RACES OF THE CURRANT.

THE September number of The American Garden is before me, and I have read with care Professor Bailey's estimate of the value of the Victoria and the Crandall currants, and the thought occurs that some notes on the races of the currant and their possible improvement for various parts of our great country might have some interest.

Ribes rubrum.—Loudon, and later, Alphonse De Candolle place all the cultivated varieties of the red and white currants known to the gardens of Southwest Europe in this species; but De Candolle hints at the ancient cultivation of the currant by saying: "The Slav names are different and in considerable number."

A careful study of these Russian varieties with the Slav names indicates that they have probably a separate and distinct origin from primitive eastern types. Of our well-known varieties, the Victoria and Long-Bunched Holland are plainly members of the eastern family of *Ribes rubrum.*

As grown in the prairie states, they differ from the Red Dutch, White Dutch, Cherry, Fay, etc., in their endurance of heat and drouth, the holding of their thick foliage until late fall, and greater longevity and vigor of bush.

We have on trial red and white varieties of this eastern race, all of which have the same habit and persistence of foliage, and some of them have peculiar pear-shaped fruit. At present I am not certain that any of them will prove superior to the Long-Bunched Holland; but for western culture they are beyond doubt the founders of a new race that will bear the heat and drouth of the west and south.

Ribes aureum.—Professor Bailey's estimate of the prospective value of the Crandall draws public attention to this native species and its possible development. The Crandall is not the only free-fruiting variety. Twenty-five years ago I grew a variety from Utah that was fully equal to the Crandall, and I have seen and tested several others. At the Exposition at New Orleans specimens of *Ribes aureum* fruit were exhibited from Wyoming that measured three-fourths of an inch in diameter. While I do not place very high estimate on the value of the Crandall for dessert or culinary use, I yet believe it will be the parent in the near future of varieties that will prove real acquisitions.

Ribes nigrum.—This species is indigenous to nearly all parts of Europe and Asia, hence we might expect to find many climatic variations. In Russia we found green, yellow, white and black varieties in cultivation, some of which were wholly destitute of the peculiar odor and flavor of the Black Naples and other South European sorts.

An eastern variety we picked up in Central Russia has thick and firm leaves, a decidedly pendent habit, and its quite large fruit is in long racemes, black or dark brown in color, and far better in quality than Crandall. Its fault seems to be unequal ripening of the fruit. We are so much pleased with the present promise of this variety that we shall try to introduce other forms we saw in the steppe country east and west of the Volga.

Ribes alpina.—Under this name we found red and white varieties of a nearly sweet currant in different parts of East Europe. In leaf, bud and fruit it wholly differs from *Ribes rubrum*, and is said to be indigenous to South Central Asia. The plant seems at home in Iowa climate and soil, and its first fruits are very satisfactory in size and quality. In inflorescence it is so near the common currant that we can hope to cross it with the Cherry and Fay, with a view to sweetening and improving the flavor.

Ribes dikusha.—Here is another name not known to our horticultural or botanical works. It is an Oriental species, cultivated even in ancient times in Central Asia. That it is closely allied to the *Ribes alpina* I do not doubt. The fruit is in racemes, and in size and flavor it much resembles the dwarf juneberries.

This brief review of the most promising species of the hardy currants of the north temperate zone is given with a view to the possible improvement in the size and quality of this healthful fruit.

Iowa Agricultural College. J. L. Budd.

LOW PRICES OF FRUIT: THE CAUSE AND REMEDY.

BY A NEW YORK COMMISSION MERCHANT.

CULTIVATION of fruit in this country has attained such proportions that, if we are to believe the statements of some growers, it is no longer profitable. If this is true we should investigate the cause, and then like sensible men apply the remedy. The cause of this depression in prices, I think, is the production of such large quantities of poor fruit, which must be sold for a price less than the cost of production. Thousands of quarts of berries, tons of unripe grapes, thousands of barrels of apples, pears and quinces which are not fit for consumption are sent to the market with the idea of getting some price for them.

Growers make a great mistake in shipping unripe grapes to market, for when the market is stocked with other varieties of ripe fruit there is but little demand for the ripe grapes, and none for the unripe. The continued shipping of the unripe grapes to market has the effect of depressing the prices for a time after the ripe grapes replace the unripe. If such varieties as the Champion, Hartford and Elvira were exterminated from our vineyards and only the later varieties cultivated and allowed to ripen before being picked, the grower would realize a greater profit from his vineyard than he now does; or if those sour varieties were permitted to ripen it would add to their value, as then they might be sold for wine. But now each grower vies with the other to get his grapes on the market first, and the consequence is that the returns from the sale of the fruit do not pay for the labor expended upon it.

Premature, wormy and imperfect apples, pears, etc., are an objectionable feature in the trade, and the continued shipping of these fruits has the same effect upon the market as in the case of unripe grapes. It would unquestionably be far better to keep this fruit at home and send to market only the ripe and perfect kinds. Not only would better prices be obtained, but the chance of having the fruit seized by the agents of the Board of Health would be reduced to a minimum. Each year these agents seize large quantities of unripe fruit and there is no redress for the shipper.

During the strawberry season there are many dealers from other cities whose business is to ship to their home customers, and I have frequently heard these men say that "although there are so many berries in market, we cannot procure enough desirable stock to fill our orders."

The self-evident remedy is to plant less acres, to devote more care to securing fruit of a better quality, and cease shipping premature and unripe fruit to market. Producers should remember that the taste of consumers is becoming cultivated and now the demand is for the best fruits. Each year it is more difficult for dealers to dispose of the immense quantities of inferior grades. To become a successful cultivator one needs brains, energy, capital and a large amount of patience and perseverance, in order to overcome the many obstacles to be met with in his business. Having succeeded in learning how to produce good fruit, the next item is to learn how to market it. One important feature is the selection of proper packages for each variety; for frequently the form of a package is objectionable to the purchasers, and one who aims at success in fruit culture must meet the wants of purchasers. Of late years the gift packages have become so popular that many refuse to buy fruit in packages on which a deposit is required. Choice fruit sells better in small gift packages than in larger ones. Some growers ship their poor fruit in these small packages, thinking that if the size of the package affects the price secured for good fruit it will also help the price of the poor stuff; but that is a mistake.

Another important item is to establish a reputation for giving honest weight and measure; and to secure this reputation, the grower must give the packing of the fruit his personal attention, for some employés think it folly to be so particular, and imagine they know how to do it as well as the employer, and do not hesitate to deceive the purchaser, thinking that their employer will not find it out. The result is that the brand is ruined without the knowledge of the owner. Possibly the owner may wonder why his fruit does not sell for its accustomed price, and the receiver, supposing that the owner is aware of the change in packing, says nothing when reporting the sales.

Again, the grower is apt to overlook the placing of the fruit wagon in charge of a trusty triver in transit to the station. A careless person can do much harm by driving over rough places without any regard to the tender character of the fruit. I would suggest to the shippers of tender fruit that they follow their drivers occasionally to the station and examine the fruit before it leaves for market. I know from personal experience that a large amount is injured in this way and the loss attributed to the transportation companies.

Let the shipper raise the covers of his berry crates and he will soon learn why dealers complain of the poor condition in which the fruit arrives. In some instances he will see berry baskets resting at an angle of 45 degrees, with one-third of the fruit gone, or he may see all of the fruit in the top tier of baskets so bruised by jolting as to be worthless. It would be wiser for the dealer to throw this tier away than to sell the whole at the value represented by the top.

An essential point for the shipper to consider is the selection of a commission merchant to sell his fruit. This being done, he will do well to inform the merchant of the varieties and quantity of each fruit he proposes shipping, and to obtain all the information he can upon the best methods of preparing and shipping the fruit; also, the kind of packages to be used in order to place the fruit upon the market to the best advantage. The dealer is generally much better informed on those points than the shipper, who would frequently save money if he would consult with the merchants more frequently. Every shipper should be on the most friendly terms with his dealer, as their interests are usually mutual.

No shipper should hesitate to ask for the information he needs, or take offence when the dealer points out defects in packages or methods of packing. I consider it a part of his duty to note and inform his patrons of these deficiences, yet I have frequently known persons to get angry at their dealers for mentioning these items, and quit shipping to them.

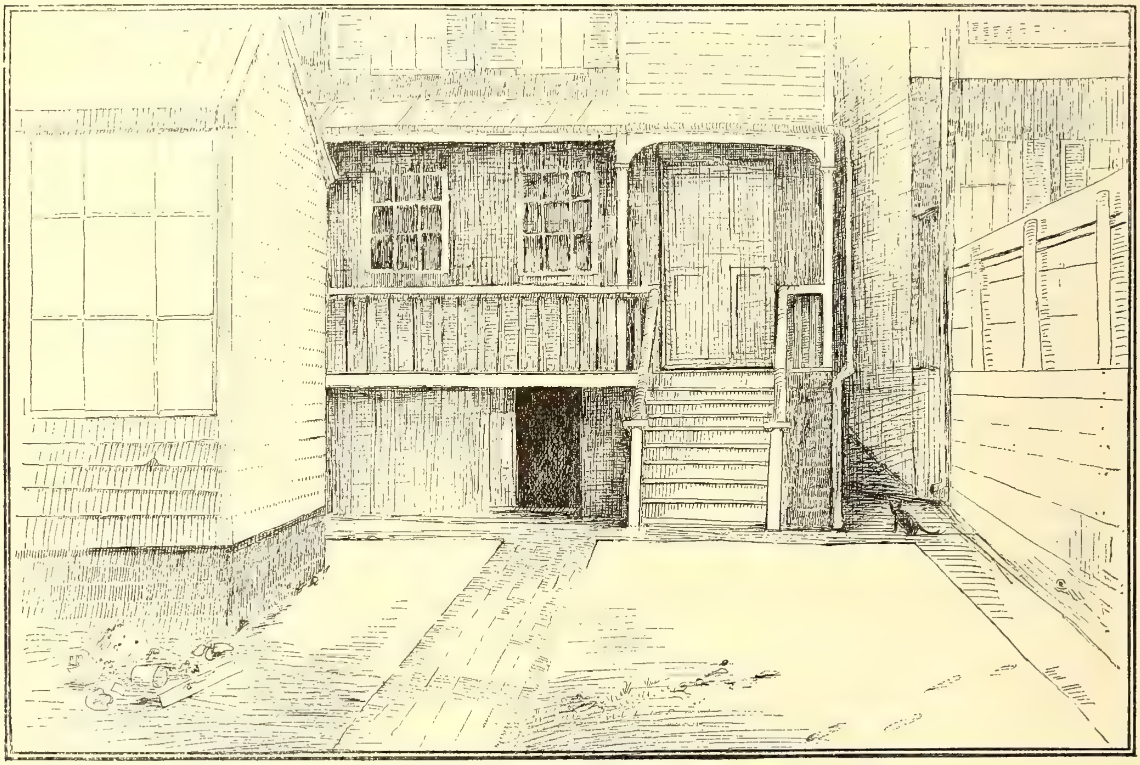
One of the great mistakes shippers make is to keep their dealers in ignorance of the quantity and varieties they have to send, or when they intend shipping. One day a grower may send a small lot of a certain variety, and should the dealer report its sale at a high price, the sale perhaps being made because it was a small lot, he may immediately double or triple the quantity, thinking it just as easy to sell much as little. On its arrival the dealer is compelled to lower the price or let it perish, whereas if the shipper had notified the dealer of the amount he proposed shipping, the dealer could have instructed him as to the quantity to send at once. Not only this, but the dealer could probably have arranged with his customers to take it on arrival at liberal prices. A curious feature of the fruit trade is that shippers demand a daily report of sales from the dealers, yet at no time during the season do most shippers give the dealer any notice of their intentions as to shipments, and be they little or much, a full price is always expected. Nor does it seem to enter the minds of some that the non-arrival of the usual quantity affects the dealer, or be a disappointment to the purchaser, who had been accustomed to get it regularly. In fact, shippers show the utmost indifference to the whole matter.

C. W. Idell.

OUR BACK YARD—II.

THE "SECONDLY" OF A LITTLE LAY SERMON.

WHEN we first took possession of what is now our garden it did not merit that name except from its great possibilities, for it then had no existence other than so many square feet of real estate, valuable, perhaps, but not beautiful. It was in very nearly the condition which I have described in a former article as that of back yards in general. But to the eye of a gardener it presented a promising field for the exercise of his art. Being on the south side of the house, it was open to the sun and sheltered from the cold north winds, so that it was likely to prove an "early garden." The soil, however, was not so promising, as the whole yard had been "skinned" of its top soil in consequence of some former grading; hence what was left was a stratum of "rotten rock," which was never intended by nature to supply food for shrubs and flowers. At that time our ideas on the subject of gardening were more general than precise, so that we also had to contend with the worst of all difficulties—ignorance. But as a perfect love casteth out fear, so a horticultural enthusiasm overcomes all obstacles, and by patient work from that time to this we have gradually converted the waste place into a small garden which, though by no means perfect, or what, in the light of our constantly rising ideals, we would like it to be, is yet a vast improvement upon the original chaos, and a source of great pleasure to us and our friends. We hold that man to be unworthy of the good gift of a garden, however small, who fails to share its pleasures with his neighbors, and give as freely as he has received. Unnumbered are the bouquets and boutonnieres which have been distributed among our friends and



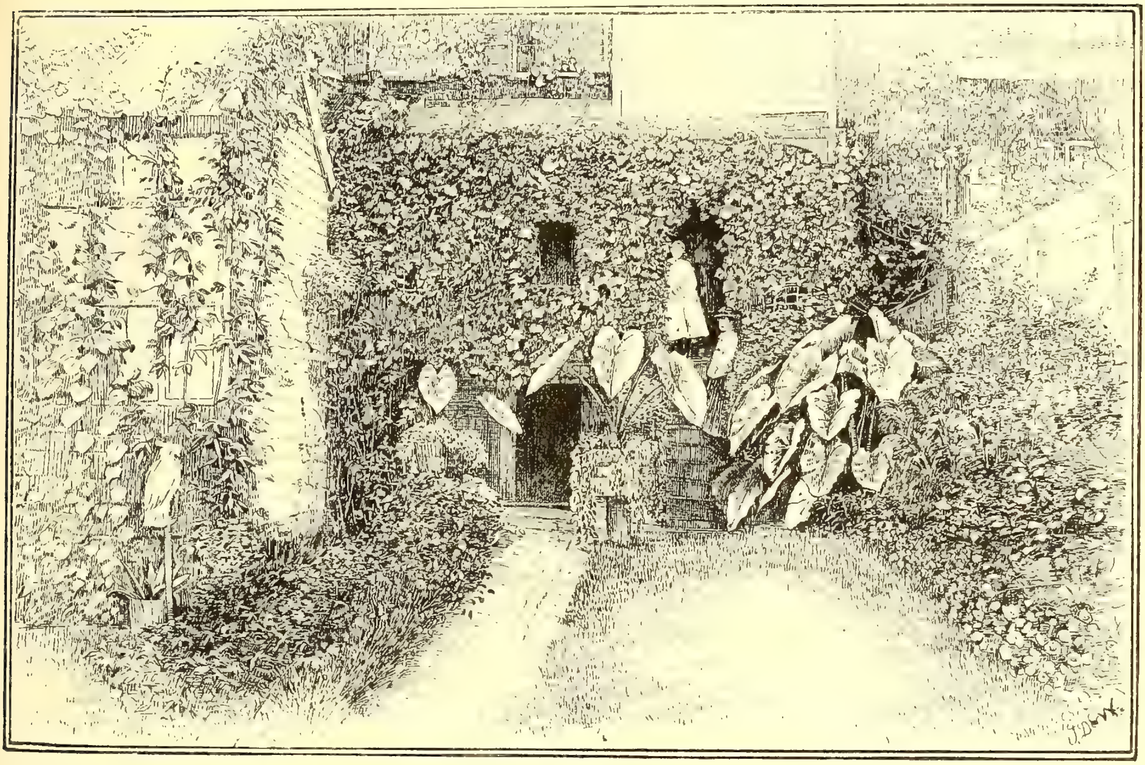
OUR BACK YARD WHEN WE FIRST TOOK POSSESSION.

neighbors, and the little garden, like the widow's cruse, is always full.

We began with the grass, which is the foundation of all gardening in these latitudes. Having smoothed off the ground with a rake, we invested a quarter in a package of "mixed grass seed," which we sowed evenly all over the parts of the yard destined to constitute our "lawn." The basis of most of these mixtures is Kentucky blue grass, which not only comes up itself, but seems to have a wonderful influence in inducing the grasses to the manor born to come up also, for the fun of choking it out. So, between the Irish and the Know-nothings, we soon had quite a respectable display of green to serve as a setting for our flowers.

We next pored over florists' catalogues with a pleasure which, alas, we can never know again—the pleasure of anticipation! It is one of the saddest facts of life that knowledge is bought at the expense of the capacity to enjoy. The flowers which we then saw with the eye of faith, while contemplating the phenomenal representations of the catalogues, we not only have never since beheld with our physical eyes, but we cannot now enjoy its visions, as in our days of trustful ignorance. Yet the mild reality is sufficient to repay all expense and labor, and the honest florist gives you your money's worth, though he also gives *carte blanche* to his artist.

Our first venture was a dozen roses, which appeared so small when they arrived, all in one little cigar box, that we were discouraged with the prospect. But when planted out and well manured, they soon took heart of grace, and in a year's time they were quite respectable in size. But I would advise the amateur florist to whom money is not an important object to buy well-grown plants in the first place, and save much waiting and uncertainty. We bought in the same manner most of the standard varieties, and now have, in the rose season, quite a fair display. We have found it best not to experiment with novelties, but to leave that to those who have more money and time. There are well-tried sorts enough to provide all reasonable variety, and the inexperienced will save themselves many disappointments if they confine their purchases to such. A Cheshunt Hybrid, a Reine Marie Henriette, a Microphylla and a very profuse-blooming white rose, name unknown, are our climbers, and, aided by honeysuckle, clematis, jessamine, Virginia creeper and several other vines, they serve to quite effectually



Our Back Yard in its Second Summer.

hide the board fences which mark the limits of our small domain. None of these things, except the roses, cost one cent. The honeysuckle, clematis and jessamine came from cuttings, which may be had for the asking, and the Virginia creeper from the woods, where all are welcome to help themselves. The beginner will find much pleasure in learning how many beautiful plants he can grow from small pieces stuck into moist sand or even the open ground, and where, as in our case, money is a prime consideration, the number of possible plants will be much increased by these experiments.

As the result of our experience we have come to prefer hardy perennials as far as possible for the use of those who can only devote a limited amount of time to their gardens. The annual vines, in particular, are not so desirable as those which are ready at the first opportunity in spring to "continue business at the old stand." And our old-fashioned columbine, cowslips, and plants of like character, are already making our garden bright before we can stick the spade in the earth to prepare it for the annuals and bedding plants.

Almost ever since we commenced gardening we have made a specialty of chrysanthemums. I believe there is no flower that the amateur can grow which makes such large and satisfactory returns for the money and labor expended. We began with one or two of the old sorts, yellows and whites, and have gradually worked up, as we learned the secrets of their proper cultivation, until now we have 25 or 30 kinds. The part of our garden devoted to them is not more than 7 feet by 25, and yet from this small bed we last season cut bushels of flowers, and at the time of writing (Dec. 1st) there are almost as many left. We first bought of a florist in New York some dozen or more named varieties, and since then we have several times bought seed. Started in the house in the early part of April, and shifted from pot to pot as they grow, we have found that 90 per cent. of our seedlings will bloom the year of planting. In this way we have obtained some beautiful kinds at a very small expense, and derived much pleasure from the surprises which seedlings always have in store for the gardener. We set our large plants in the open ground, in rows, and work between them freely with a hoe about once a week during the continuance of warm weather, watering with a hose whenever needed in the least degree. About the time of flowering we build over the entire bed an awning or tent of cheap cotton on a framework of light pine sticks, just high enough to walk under, which, in our climate, is ample protection from frost. Chrysanthemums cannot be had in perfection without work, but if you give it they will repay as surely as the coming of November.

Disappointments have come, of course, and moments of discouragement. For some reason, probably the original poverty of the soil, our ever-blooming roses have never done well, neither blooming profusely or handsomely. But we hope next spring to dig out the present earth from their bed and replace it with very rich soil, and shall expect better results.

I have tried in this article to give some hints to those persons who know little about the common facts with which the beginner is confronted when he first attempts to "make things grow." I would have been glad of some such information at the outset of my own career in this line, but what we have learned has been learned by the painful but effective process of butting our heads against the stone walls of natural phenomena. I hope such readers of the GARDEN as attempt to follow in our path will avoid these obstructions, and at the end of the next floral year have no failures to record.

The pictures with which this article is illustrated are from photographs taken by an amateur friend, and are given, not as illustrations of perfection, but as showing what progress we have made in our fight with ugliness. It is to be understood by the reader that this is an ordinary city back yard, the size being about 30 feet by 70, surrounded by rough board fences. Notwithstanding our efforts to "comprehend all vagrom" cats, an errant Tommy occasionally finds his way into our flower beds, doing damage thereto; but a remorseless rifle, and a steel trap in which we in one night captured six, have thinned the feline population to reasonable proportions. The GARDEN'S sketch of our yard "before treatment," as the patent medicine men have it, is very mild, and shows an imagination rigidly controlled by the love of truth. P. H. STANSBURY.

A RACE OF FLOWERLESS PLANTS—I.

FUNGI—WHAT THEY ARE AND HOW THEY LIVE.

It is difficult to make a definition that will include all fungi and exclude all other organisms, because of certain exceptional cases. But it may be truly said that a fungus contains no leaf-green, and any plant possessing this coloring matter may at once be excluded. Some plants, however, which are never green are not fungi, as, for example, some flowering plants, such as Indian pipe and beech drops. These are excluded, because they have flowers, and fungi have none. Their cell structure would distinguish them also, for while the substance is essentially the same, the form of the cells is very different. The stem of a mushroom is made up of long and slender filaments, called collectively the mycelium. Fig. 1 shows a highly magnified portion of the mycelium of a fungus allied to the mushrooms. Figs. 3 and 6 show special forms of mycelium. In mushroom culture the so-called spawn (Fig. 2) consists of rather coarse strands, each strand being composed of many mycelial filaments. A portion of spawn for planting consists of many interwoven strands contained in a mass of vegetable matter or "brick." Mushroom planting is, in a general way, like potato planting. Fig. 2 shows young mushrooms being formed at various points. When the mushroom itself appears, it is also found to consist of mycelium, which under the microscope looks much like threads of fine linen interwoven, lying in various directions. They are similar to those shown in Fig. 1.

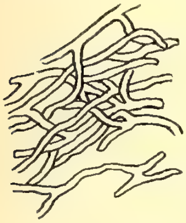


FIG. 1.

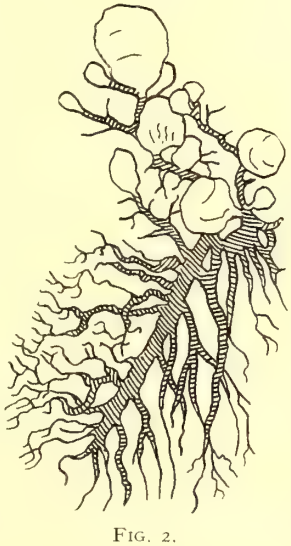


FIG. 2.

The mushroom is representative of a large number of fungi which live on *dead* organic matter, and are for this reason called *Saprophytes*. Others, many thousands, are *parasites*, growing on *living* organisms. Saphrophytic fungi grow on decaying matter in the soil, as mushrooms; on timbers in buildings, causing decay; dry rot on logs, sticks and fallen leaves in the forest; on bones, feathers, cloth, old shoes; causing mildew on bread, canned fruit, jelly and various other articles of food, as mold; and certain peculiar fungi, known as bacteria, cause fermentation and putrefaction.

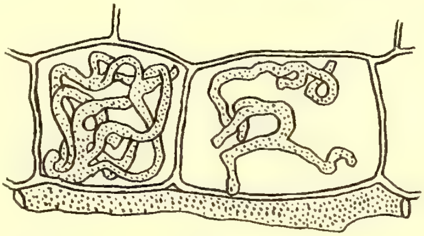


FIG. 3.

Thus many fungi which are not parasitic are injurious. But most of the injurious fungi are parasitic. A few grow on men and animals. Ring-worm is caused by a fungus; several species have been found in the human ear.

The cultivator has most to do with those which grow on living plants, and they are numerous and very varied in form and mode of growth.

Some of these grow on the surface of leaves, covering them with a white mildew. Watch the oak and the lilac leaves, for instance. The individual threads of mycelium may be seen by careful looking, resembling a very fine spider web lying close upon the leaf.

The *fruit* of these fungi may also be seen as black specks among the white threads. These black specks are really minute spheres which contain sacks of spores. In the great majority of cases, however, the mycelium is inside the supporting plant, and penetrates among and into its cells (Fig. 3). Often there are special "suckers" to absorb nutriment, thus answering the purpose of root-hairs.

A few groups of fungi have no mycelium. This is illustrated in the yeast plant, which consists of a single egg-shaped cell. Fig. 4 shows some isolated yeast plants and some which are united in chains.

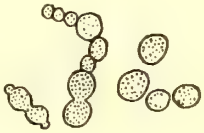


FIG. 4.

Fungi have no flowers. Some have organs answering the purpose of flowers, but microscopic in size and in structure, bearing no resemblance to them. Most fungi have spores in place of seeds. A seed has a young plant already formed within it; a spore has none, and in many cases consists of only a single cell. This is true in the case of the mushroom. (See Fig. 5.)

All that is seen of a mushroom above ground grows for the purpose of bearing spores. The vegetative part is the spawn in the soil. The stem comes up bearing the cap; the under surface of the cap is lined with gills; the surfaces of the gills have many special (microscopic) cells, which stand out perpendicular to the surface; each of these has at its tip four projecting points, and each point bears one spore (Fig. 5). The purpose of the spore is the same as that of the seed—to produce a new plant.

The downy grape mildew has two kinds of spores: one formed inside the grape leaf, the other outside. The mycelium is inside the leaf. It produces special branches, which grow out through the breathing pores of the leaf, then branch out like microscopic trees, and bear a spore at the tip of each branch. It is this growth that is so abundant as to form a white down on the under surface of the leaf, whence the name downy mildew. These are the summer spores. In time of active growth there is a fresh crop of them every morning. They germinate quickly, being disseminated in drops of dew or rain, but if the conditions of the germination fail they die soon. Here is a place to supply a remedy, or rather a preventive, to check the spread of the fungus.

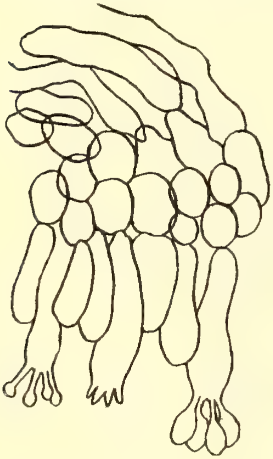


FIG. 5.

Spores of the other kind are formed in the substance of the leaf singly. They have a thick, hard coat, which fits them to live over winter. Here a remedy again: burn the fallen leaves in autumn.

Wheat rust has three kinds of spores, and one kind, curiously enough, does not grow on wheat, but on barberry. Of this more may be said at another time. On the wheat itself the summer spores constitute what is called red rust, and the winter spores constitute black rust.

The number of spores produced by fungi is very great. On a single infested wheat plant or grape leaf there are millions, and each spore, under proper conditions, is able to spread the disease. Of course, a large proportion perish, just as among seeds and pollen grains belonging to flowering plants. How many thousands of millions of spores must be contained in a great swelling of smut on a cornstalk, or in a giant puff-ball three feet in diameter, both of which are filled with fine dust, each particle of the dust a spore! A cubic inch of space is large enough to contain more than eight thousand million corn-smut spores.

Spores, of course, germinate and grow in the same general way that seeds do. A spore most commonly protrudes a filament of mycelium, which by continued growth forms all the mycelium, all the vegetative part of the mature fungus. Fig. 6 shows a germinating spore of the red rust of wheat.

How does the fungus get into the plant? In some cases, for example, in the potato rot, the spore sends a slender tube through a breathing pore of a leaf, the tube enlarges inside the leaf, and all the semi-fluid protoplasm passes in. Once inside it can make its way almost anywhere among the soft tissues. Corn-smut gets in when the corn is coming up; then it grows all through the green parts, showing no signs of its presence for weeks or months, but at length bursting out with a mass of soot-like spores in almost any part of the plant. The absence of leaf-green in fungi demands more than a passing notice. It is the most important thing about a fungus. If fungi were green we would hear nothing about fungus diseases of plants, wheat would never rust, potatoes would never rot, bread would never mold, nor clothing mildew. Foul drains would cease to be dangerous, or cease to exist. On the other hand, we would have no yeast bread, no vegetable mold to enrich the soil, fallen branches and leaves would accumulate indefinitely in the forests without decay.

Why? Because if fungi were green they would take their nourishment from the soil and atmosphere, as green plants do, and would not live on organic matter. Their lack of leaf-green forces them to depend upon something that some green plant has produced from the soil. In this respect fungi are like animals. The question of respiration comes in here also. Animals breathe in the oxygen of the atmosphere and exhale carbonic acid. Fungi and all other plants do the same thing. This is a universal characteristic of life and growth. Green plants are peculiar, in that they do this and the opposite thing also. All organisms consume food, only green plants produce it. The process of production is necessarily the reverse of consumption. On the one hand, consumption, respiration, *oxydation* or burning—oxygen consumed; on the other, assimilation, deoxydation or unburning—oxygen set free. In sunshine green plants take in carbonic acid and give out oxygen. We see also why fungi can grow and complete their life in darkness as no other plants can—a distinction which cannot fail to interest the observing horticulturist.

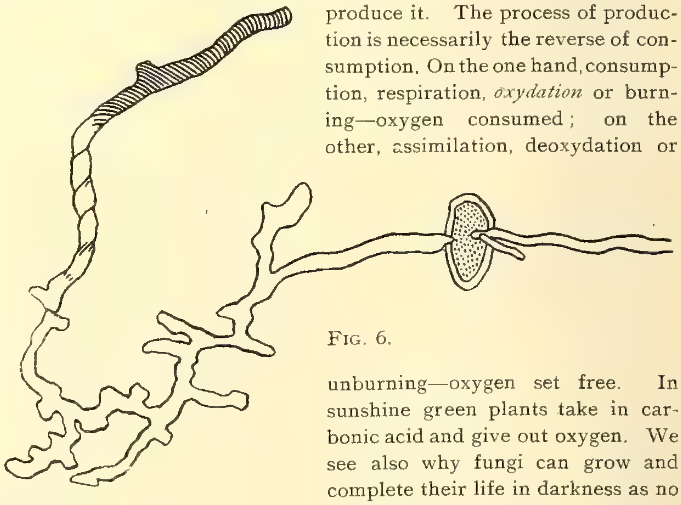


FIG. 6.

Harvard College. A. B. SEYMOUR.

A VIEW AT DOSORIS.

A PRACTICAL LESSON IN THE GROUPING OF TREES.

WE would call attention to one of the best examples of hardy landscape planting to be found in America. The view is taken from one of the lawns at Dosoris Island, the residence of Charles A. Dana, Glen Cove, Long Island. Although it is a private place, it deserves to rank among the educational institutions of our country, from the benefit horticulture has received from it by the careful, practical, enthusiastic and artistic manner in which it is carried on. Although the general public are more familiar with the beautiful productions from there that are exhibited at the shows, those who have been fortunate enough to visit the place itself know that it has a glory aside from that of the greenhouses and exotics.

Our view looks towards the north-northeast, over the blue waters of Long Island Sound, and some dozen miles beyond, not seen in our little picture, are the shores of West Chester, N. Y., and part of Connecticut. On these broad waters pass in summer the finest yachts the world has known, and the variety of craft that give animation and interest to the scene at different times is as great as found any where. A growth of locusts, that came naturally from some planted here long before, mingled with the native growth and once shut off much of the beauty and interest of the scene. While it was desirable to retain some of this for protection and its own worth, much of it had to come away to make room for other things and show the beauties of the views beyond.

In cutting out an old and somewhat crowded growth, and uniting with it newer planting in a way to harmonize, we have one of the problems that often confront the landscape worker, and too frequently are beyond his skill. The successful way in which this has been done in the spot we are considering is worthy of particular attention.

Too often the problem is simplified by cutting down all of the old wood, instead of retaining with judgment part of it and nursing and training it into good form. The locust, never at its best nowadays, owing to the ravages of borers, is nevertheless useful in many situations where other trees will not grow; its young and feathery growth is delightful from its color and freshness, although never abundant; the rough, broken and angular branches contrast well with other things, and the trunks of large trees have a rugged picturesqueness peculiarly their own. It has immense vitality, and thrives directly on the borders of salt water where many things refuse to grow. It has been found excellent here to plant on steep sandy banks to help bind them, and encourage the growth of grass, wild asters, etc., spreading its roots for long distances and retaining the light soil in position. The red cedar, too often despised, is one of the best of evergreens for the seashore, thriving with neglect and exposed to every blast. It abounds naturally in this locality, and a few can be seen in our picture to the right just back of the other evergreens, their dark forms giving a tone and depth of color, among other things, that wonderfully help the scene and the delicate tints of sky and water beyond.

No abrupt line was left between the old and taller growing trees when the rest were cut away to disclose the view, and the dwarf evergreens were planted around and among them with rare judgement and skill, forming a rich border for the lawn and foreground for the view. The old hickory on the left, allowed room to develop, rises with the dignity and grace of an elm, and its toughness defies the fierceness of the northern gales that sweep unimpeded over miles of water. The tall white spruce next to it has had the advantage of some twenty-five or thirty years of growth, and its dense masses of thick foliage bear up against the icy winds of winter and summer's fiercest sun, although wanting protection in their early years. On a bleak exposure like this only the hardiest subjects could be used, and they were the mugho and dwarf white and Scotch pines and low junipers. On the south of these (the little cushion-like trees in front) are some dwarf Gregoriana and pigmy Norway spruces doing well. On the other sides they would have starved for want of sunshine and nourishment. The beautiful dwarf hemlock spruces, Hudson's Bay dwarf pine and dwarf yews are all useless on such an exposure, but all excellent when sheltered from the drying, biting winds. Evergreens only look well in such a position, and they show their charms at all seasons. Deciduous shrubs of many kinds can often be happily used for banks of this sort, but in a spot exposed to the north and east like this the effect is never so tidy and pleasing as when the planting is solely of evergreens. The wonderful effects of color that can be given with evergreen growth, in our latitude even, is a delightful surprise in store for those not familiar with it. The broad mass of Douglas' golden juniper partly shown at the edge of the group, on the extreme right, appears like a bright gleam on a sombre bank. The effect is particularly pleasing as seen when driving over the road near the water's edge. These dwarf trees are never trimmed, requiring none. Their nature is as dense as it is possible for them to grow without choking, inclining always to breadth rather than to height. Once well started they are a constant pleasure.

A little picture in black and white of course fails to more than suggest the beauty of such a scene; but it affords a valuable lesson in grouping, so little understood. We can give but a single view, but walking in front or among the trees a succession of beautiful effects is produced. From the piazza of the residence the view of the landscape and water is perfect; the low trees enhance its beauty, and do not impede it in the least.

HYACINTHS AFTER HOUSE CULTURE.

Take the good when you lose the best. I know some people who grow hyacinths in earth instead of water for winter flowering, and always discard them in spring as soon as flowering time is over, under the impression that they will not bloom again. This is a great mistake, for though the spikes of the second growth are smaller, they are very useful and pleasant to look at in spring if planted in out of the way nooks and corners to surprise us the next spring time. I find that the bulbs that have been grown in water are more exhausted, but if they have been fairly planted in good earth and allowed to dry off gradually after blossoming time there will be a sure reward.

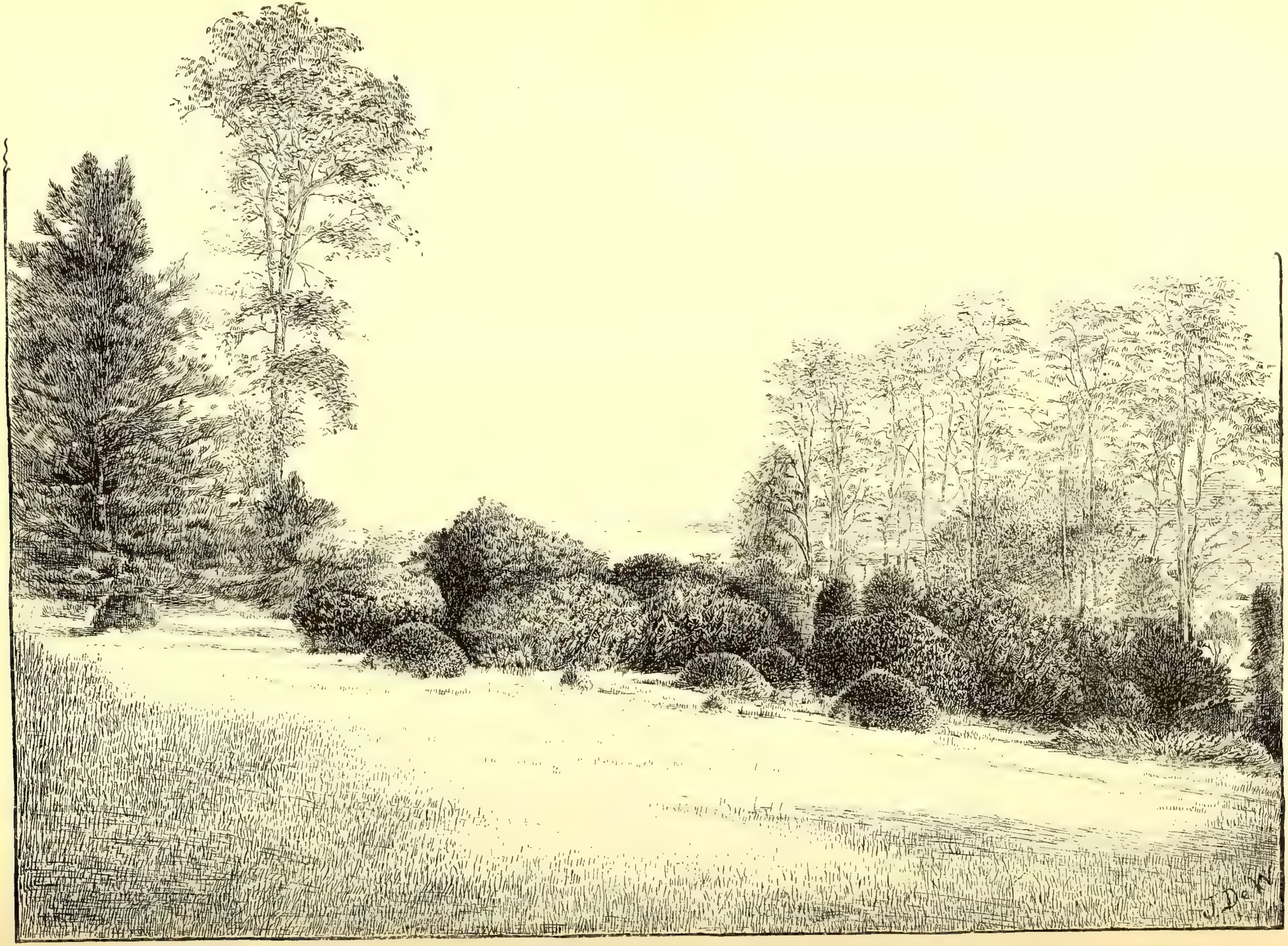
My own box is like a miniature garden, being in a box covered on the outside with birch bark, filled with sandy loam, and the bulbs planted for effect, the taller spikes to the center and a border of miniature hyacinths along the edge. The pretty little grape hyacinth fills in the corners.

Scillas and snowdrops soon recover and go on blooming during after years, and tulips are not long recruiting. It is a wonderful flower, this hyacinth, and a general favorite, though many economical people think it an expensive flower because it will not bloom the second year in the house. That is too much to expect; there is surely some spot out of doors where they can be planted, and return again after many days. It seems strange in looking over any catalogue, to see the list of varieties that have been raised since the sixteenth century when there was only four sorts, the double blue, purple and violet, and the single. There is one special convenience about this plant for the house—it is less affected by changes of temperature than any other and will even stand a slight degree of freezing. I have often tried to get the English blue-bell, *Hyacinthus non-scriptus*, but have never found it in any seedman's catalogue. In England it grows in woods and copses, by the side of ditches, bank of streams and elsewhere, and has beautiful drooping bells that are of an intense deep blue, growing only on one side of the stem. The bulbs are often sought for to make starch. In the language of flowers the colored hyacinth means "play" sport, while a white flower signifies "unobtrusive loveliness." The old bulbs of our window garden generally gives us pretty little spikes the third year when planted out of doors, and then seem to decay and disappear.

ANNIE L. JACK.

[Our forefathers had quite a variety of hyacinths also. In 1612 a curious work was published in France by a monk, Louis Liger d' Auxerre, which was, as the publisher informs us, "newly done into English" in 1706. He tells us that "the hyacinth of several colors is one of the prettiest flowers that is. Its flowers grow in the form of little cups, and rise out of certain parts which resemble little narrow pipes, and when these flowers are blown they are turned in, and so represent a sort of lily. Nature seems to have formed them with intent to raise the admiration of spectators. The hyacinths multiply, as well as many other flowers, by the seed sown, as is hereafter directed. The bulbs that spring from it do not yield flowers till the fourth year, and are not always of the same color with the hyacinths that bore the seed; for, oftentimes from a white hyacinth we raise a red one, or a white one from a red one." Those who have tried it say that if the flowers from bulbs that have bloomed in the house, are plucked off in the bud for four years, the fifth year bulb is nearly as good as the original.

THOMAS MEEHAN.]



A Good Example of Tree Planting. View at Dosoris, Residence of Charles A. Dana.

WHITE SPRUCE (PICEA ALBA).
HICKORY.
MUGHO PINES. DWARF WHITE PINES.
DWARF (GREGORIANA) AND PIGMY FORMS OF NORWAY SPRUCE.
LOCUST TREES.
RED CEDAR (THE DARK COLUMNAR TREES).
DOUGLAS GOLDEN JUNIPER.

AN EARLY WINTER GARDEN IN CALIFORNIA.

I AM in a garden on a farm in Alameda county, near the hills, and about thirty miles from San Francisco. To-day is November seventh. There was a week of rain a while ago, which started the grass by the roadside and on the hills. It has grown so much now that I have just been watching a little girl pulling up handfuls from under the cherry tree to feed, with many a pretty whisper, to a pet colt in the barn yard.

The sky is clearest blue, and almost without a cloud. The air is warm and fragrant with blooming flowers. Some evenings we have a fire, and sometimes we do not need one. There will probably be several weeks of this kind of weather—then we shall expect more rain. But everything is now in good warm, "growing condition," and the men are cultivating in the orchard, to stir the surface and keep the weeds from growing. They have begun to prune the cherry trees, too, although the leaves are yet green, not shrivelled or turned yellow. It will not hurt the trees, this early pruning; they get more rest that way, and will bear better crops next year.

The large La Marque rose on the porch on the east side of the house has about eighty full-blown roses and several hundred buds on it. The Banksias, both white and yellow, are still blooming a little, but not like the La Marque. In the garden, one can gather hundreds of roses. Among them I notice Maréchal Neil, La France, Duchess of Brabant, Triumph of Luxemburg, Safrano, Appoline, Jacqueminot, Rosamond, Cloth of Gold and Marie Van Houtte. Down in the nursery rows, three hundred yards north of the house, roses of all the leading sorts, two years old from cutting or bud are blooming so abundantly that they make quite a distinct feature of the November landscape.

I am very much attracted by the English ivy at this season. It blooms abundantly here in great upright spikes, frequently eight or ten inches long, and is continually haunted by bees, a dozen or so to every cluster of the yellowish flowers. There is nothing else in the garden now, not even the orange blossoms, that the bees like so well. Ivy has been planted about the walls of stone churches in San Mateo and Marin, and covers them to the eaves. There are also old sycamores in the neighborhood that are completely ivy-clad. At this season such ivied walls and trees are musical indeed!

Since the rains all the smilax vines growing over bits of fence and bushes, in various places, have taken a fresh start, and have thrown up long shoots from the ground. There are many seedlings about them, and the aforesaid little girl has gathered about two ounces of seed, to sell to some florist for "pin-money." There are hundreds of nasturtiums and morning-glories, springing up as fast as possible under the old vines, which have not yet done blooming. The last time I planted a lantana, it seeded the ground so heavily that I have never wanted another, even if it does "bloom all winter."

The heliotrope bed is one of the prettiest things south of the house. Not a leaf yet touched by the frost, and a mass of bloom most of the time for the last five years. Near by is a large vine of the Catalonian jasmine. It comes very near being a daily bloomer here, and covers a large part of the porch. The only enemy is the brown scale, and a little spraying cures that. The golden rod, grown from seeds gathered in New England, seem to have lost their bearing in this new climate. They grew large and strong, and began to bloom in July. They bloomed finely—as well as I ever saw them bloom elsewhere—and went to seed, but most of them have lately thrust out side-shoots, and are just begining again. The pale lilac New England asters knew better. They grew and bloomed all summer, but this June-like weather does not seem to tempt them to an aftermath. There is a good deal of this second-blooming here. We cut the hollyhocks all back to the ground in early September, and by this time they have thrown up new blooming shoots, not quite so tall, but fully as floriferous as the first. The cannas need no cutting back—they will bloom on for weeks to come.

There are some things that a stranger would especially notice in the grounds. The largest *Magnolia grandiflora*, for instance, shows by its beautiful red, imbricated seed-cones that it bloomed abundantly in its own season, and yet there are open flowers and buds on its topmost boughs. The banana, not the hardy Abyssinian sort nor the dwarf, but a common yellow-fruited sort, stands in a sheltered spot, a very handsome large plant. About one winter in five it is killed to the roots, but always sprouts out again. Near it are large orange and lemon trees, heavily fruited and in bloom. A plant of the *Brugmansia suaveolens*, perhaps five feet high, is loaded with its large sweet, white flowers. This sounds semi-tropical, certainly, and innumerable such illustrations of the climate could be given from plants within sight of where I sit and write this. But, on the other hand, at the corner of the kitchen is a pile of boxes of winter apples and pears, grown in the orchard, a quarter of a mile distant; grown on the same kind of soil, at the same elevation, with the same exposure? There are Bellflowers, Baldwins, Newtown Pippins, Limber Twigs, Spitzenburgs, Jonathans, and all the old apples, with a few California seedlings besides; there are Easter Beurre, Winter Nelis, Beurre Clairgeau, and other winter pears.

But I must not wander so far away from the garden, in the midst of which I sit in my shirt-sleeves this warm November afternoon, and watch the men at work in that curiously confusing way incidental to California. One man is replanting daffodils and paper-white narcissuses which have become too crowded, but some of those he takes up are ready to bloom and, in fact, some which he left have been in bloom a week and more. Another is pruning cherry-trees. Still another is plowing in the orange grove. A fourth is bleaching and sacking walnuts and almonds which have been drying on wooden frames in the sunlight. Many different operations of field and garden mingle strangely at this season here. The house-servant goes down to pick blackberries for tea, and passes men digging blackberry plants for sale, and others planting out blackberry roots for sale next winter. The same may be said of raspberries and strawberries. There are ripe berries, green berries and blossoms often on the plants dug up to be sent away.

"I don't know which to do first to-day," said one of the men a little while ago, "whether to sow peas in the vegetable garden, or gather the quinces and box them for market."

I have been walking around the garden again, just to notice what I find in bloom. I have rather a dislike for the set lists, in double columns, of "flowers blooming at noon on January 1, in the south-west corner of Smith's old sheep pasture." The botanical journals do not print such things as often as they did 15 years ago. I would rather make one feel, if possible, the wealth of color and fragrance in the air of this warm Santa Clara valley, hardly four miles from the bay of San Francisco. I have told you of the bees in the ivy. The humming-birds gather about the great abutilon bushes, so laden with drooping turbans of mottled carnelian. If we did not cut the plants nearly to the ground every year, they would be trees, 20 feet high. They bloom unceasingly, just as the fuchsia-hedges do, and over them the humming-birds poise and dart with their gleaming, musical motion. But if I were making a list? Then I should not forget the wide chrysanthemum beds, named varieties staked up, and ready to go on till Christmas. Nor the masses of cosmos, just in their prime; nor the dahlia, geranium, gladiolus and petunia. The *Anemone japonica* is still blooming, as it has for months, one of the most satisfactory of all our garden favorites. There are pansies still, the violets have come, and, as I have hinted, the daffodils will be here before many weeks. Of such fiber is woven the warp and woof of California gardening; almost perennial life, almost perpetual growth, burden the soil with surprises. And what is that so spicily fragrant in the air, as the south wind blows across the avenue? Only the loquat blossoms (*Mespilus japonica*); and by April the clusters of yellowish sub-acid fruits will be ripe.

In all the sweep of vision, hardly anything except the large American tulip tree (liriodendron), and the rows of Japanese persimmon trees show autumn garbs. The leaves of the former are golden yellow; the latter is loaded with rosy, crimson and purple leaves, magnificent in shading and artistic effect. The American black walnut and some of the Persian walnuts begin to look quite like winter, but the figs still hold their green leaves and ripe fruit, and the pecan avenue is as beautiful as in mid-summer! A horticulturist, used only to climates of sharply contrasted season, is struck with a sort of bewilderment at such a state of affairs,—but I have written down, with strict attention to details, the everyday aspects of early November here.

CHARLES HOWARD SHINN.

Alameda County, California.

THE STORY OF TRAILING ARBUTUS.

"But fairer than all flowers,
First-born of sun and showers,
Is the Arbutus, jewel of the spring."—H. H.

LISTEN to the story of the arbutus, if you would know what it is, where it grows, how and why it finds its way to distant hearts and homes.

Listen, if you would understand the Puritan flower, modest, simple and sweet:

"We belong to a grand old family called ericacæ. Botanits call us *Epigæa repens*, because we 'trail upon the earth;' but we like best to be called by the prettier name of trailing arbutus. Among our many cousins we number the laurels, rhododendrons and azaleas, which flourish on your lawns and in your greenhouses. We are kin to the delicate pyrola, the Princess Pine, and the good old-fashioned wintergreen; but you would not dream that we could also claim the ghostly Indian pipe, that parasitic ne'er-do-well, that appears in June and steals a living for a month or two.

"Let me take you

"' * * * on and up,
Where Nature's heart
Beats strong among the hills'—

place you on a grassy knoll sloping gently toward the west; here is a shallow ravine; low shrubs are abundant as well as the ground pine.

"A cry of delight escapes you. Ah! you see us! a perfect mat at your feet, rivalling the Persian designs which you think so beautiful. Our pink and white blossoms are half hidden by delicate mosses and our own green and russet leaves. Nothing is quite perfect in this world, they say, and we must own that our leaves are not pretty. They were made for use—to protect our tender buds through the long winter, to breathe for us the strong, invigorating air of early spring, that we may be ready to smile when the warm sun and gentle rains touch us.

"Fill your basket where you are if you like; but, as you cannot take us all, why not pick for the best?

"Go higher up the hill; around those little pine trees you may find the largest, sweetest clusters of all nestled under the silver threads of last year's grasses. We see a deal of life, for our 'spring opening' is eagerly looked for by young and old.

"Troops of merry children come, and our hill rings with the voices of 'glad boys and girls.'

"We sometimes wonder, when the sky is so blue over our heads and rosy-faced children are picking our blossoms for the tired mothers, who must stay at home, if it is not true that—

"'Children and flowers
Lie very close to God.'

Now and then an old man comes to gather a few flowers for a sick grand-child; he is very old, and his wrinkled hands tremble so as he bends over us that we wish for his sake we could grow taller and be more easily picked.

"A shy young man comes all alone; he finds the choicest flowers that grow; we can guess their mission, for though the arbutus

"'Looks so shy and innocent,
Blushes like a startled thing,
Who would think it knew the whole
Of the secrets of the spring?'

"Sometimes a coy maiden sends us to a distant 'friend,' and we laugh in our sleeves as we hear that 'friend' say 'his *aunt* sent them!'

"Real flower lovers come often; for them each time we

"'Sing a more wonderful song,
Or tell a more marvelous tale.'

"But there is more prose than poetry in all our lives. Fair skies and gentle breezes will not keep cut-flowers from wilting. We are growing faint and weary, so they hurry home with us, place us in pans of water in a cool, damp cellar, where we drink and drink until we are full of moisture and well equipped for the journey before us.

"Skillful fingers fashion us into dainty bouquets —flat on one side, remember; then each bunch is sewed, yes, actually sewed to the bottom and sides of a strong pasteboard box; sprays of damp moss are sprinkled over us; we are properly done up, and off we go by mail or express.

"It makes no difference now how roughly we are handled, for we are not beating our rose-colored heads off against the sides of tin boxes. Could you but witness our reception when the box is opened, perhaps in some distant city home, and hear the exclamations of delight as we fill the air with our 'strange and wonderful sweetness,' you would understand that we came to gladden the hearts of all who see us, to make new friends and cheer our old ones.

"Busy, care-worn people pause to look at us, friends of childhood days, and as they gently touch our dainty blossoms, lo! for them,

"'The soft south wind of memory blows.'"

G. A. Woolson.

ARBUTUS IN THE GARDEN.

HENRY WARD BEECHER'S ESTIMATE.

It is my good fortune to know the home of the trailing arbutus (*Epigæa repens*), one of the most exquisite of nature's fondlings. It grows in the greatest profusion and luxuriance, where we can pick again and again until we have satisfied our own grasping desires and those of our then numerous friends. What a treat is a day in the woods, wandering up and down—searching, plucking and arranging the dainty blossoms; some pure white, some white, suffused with pink, and some, where they have had clear sunshine, a clear deep rose color; and all so pure that they can lay their faces on the earth and remain unsullied.

The winter has been kind to these delicate, though hardy forms. Hardy they are in the sense that they will endure a severe winter, but at the expense of foliage and flowers; they live, but do not thrive luxuriantly. After a severe winter the foliage is browned to a crisp, the flowers have a starved, withered look; they scorn to resent the treatment of mother nature, and frown rather than smile at the vernal sunshine. I would like to describe this plant, but cannot do it justice, so borrow from Henry Ward Beecher, whose love and enthusiasm for this flower was unbounded.

"Who would suspect by the leaf what a rare delicacy was to be in the blossom? Like some people of plain and hard exterior, but of sweet disposition, it is all the more pleasant by surprise of contrast. All winter long this little thing must have slumbered with dreams at least of spring. It has waited for no pioneer to guide, but started of its own self, and led the way for all the flowers on the hillside.

"The odor of the arbutus is exquisite, and as delicate as the plant is modest. Some flowers seem to make an impression on you. They stare at you; they dazzle your eyes. If you smell them, they overfill your sense with fragrance. They leave nothing for your gentleness and generosity, but do everything themselves. But this sweet nestler of the hillside is so secluded, half-covered with russet leaves, that you would not suspect its graces did you not stop to uncover the vine, to lift it up, and then you espy its secluded beauty. If you smell it, at first it seems hardly to have an odor, but there steals out of it at length the finest, rarest scent, that rather excites than satisfies your sense. It is coy, without designing to be so, and its reserve plays on the imagination far more than could a more positive way."

The question is often asked, Can the arbutus be cultivated in the garden? Certainly, if properly attempted. Take up a large clump in autumn, or when possible in winter; without much disturbance of roots, transfer to a partially shaded position; protect with leaves, as nature does, or keep in a cold-frame, protected from sun and cold, and it will bloom profusely. The English gardeners propagate it as freely as they do the azalea, and with as great success. But don't! Let this beautiful sweet child of the wood nestle in the bed that nature has prepared for it. Like the thrush, it belongs to the wood by inheritance; let it enjoy its secluded home in its own unostentatious way.

C. L. A.

SOME IMPLEMENTS AND DEVICES.

Several devices for the facilitation of garden labor have grown out of my practice during the last two or three years. They are mostly very simple, yet I find them useful, particularly for work which is partially experimental.

A Handy Wagon (Fig. 1).—This is a combination fruit and truck wagon. The body projects over the wheels, giving a very large surface for the handling of crates, boxes, barrels, etc, I use a 3-ft. wheel, with a 2½-in. tire. The body is 4 ft. 8 in. by 12 ft. It is used either behind a pole or thills.

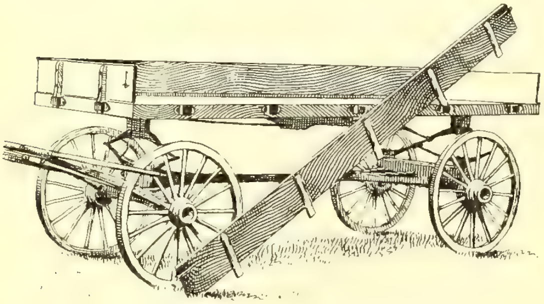


Fig. 1. A Handy Wagon for Garden Use.

A Handy Cart (Fig. 2).—This is a platform handcart, so stable that it can be used in the field as a table, upon which the sorting and weighing of experimental crops is done. We find it indispensable. We use a 3-ft. wheel and a wide tire. The body is provided with a border an inch high all around.

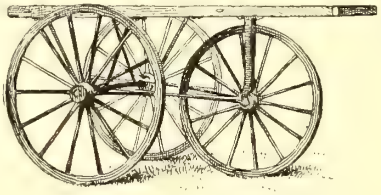


Fig. 2. A Handy Cart.

Pollinating Kit (Figs. 3 and 4).—So many little articles are needed in the pollinating of plants that I have found a kit for holding them indispensable. My first outfit was a half-bushel apple basket, which was soon displaced by an oblong peck market basket. Both these had the advantage of the greatest democracy of contents, for bags, strings, pencils, notes, and other trifles, made most promiscuous acquaintanceships. Leaves, sticks and other litter drifted into the medley, and to complete the confusion someone was sure to want the basket the moment I set it down, and all my stock in trade would next be found in the ash-pit or under a bench. And when I loaded up again I was sure to omit something, for there were no compartments to suggest a complete outfit. This shortage in my accounts was usually detected too late, both for the experiment and for my patience. I next tried my pockets, but the article was always in the wrong pocket, and there was too much of everything else in every pocket, anyhow!

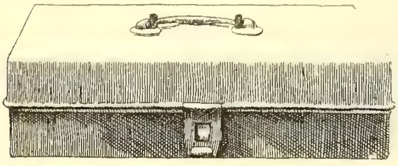


Fig. 3. Pollinating Kit.

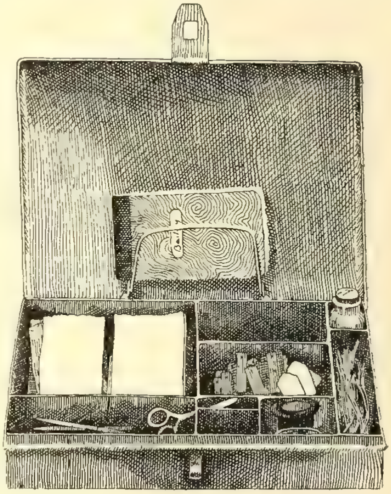


Fig. 4. Pollinating Kit.

So a tin box, with a place for each trifle, finally grew out of my experience. This box is 9 by 12 inches and 3 inches deep. A chest handle is placed in such position on top that the box balances nicely in the hand. The bottom of the box, which is two inches deep, contains in the upper left-hand corner a large compartment for bags. Adjoining this is one of similar size for labels. The artist, for some reason of his own, has made this compartment into two. Below the bag compartment is a long box for pencils, camel's-hair brushes—which I carry wholly out of respect to instructions in books, for they are of little use—a jack-knife, small scissors, and two or three smaller but very useful trinkets. Two or three little compartments join this, in one of which is a lens—I find a photographer's finder the best lens for this purpose—and in another two or three small vials and boxes, in which I sometimes collect pollen. Along the right-hand side is a compartment for strings, which are cut six inches long, and in the upper corner is a small bottle of

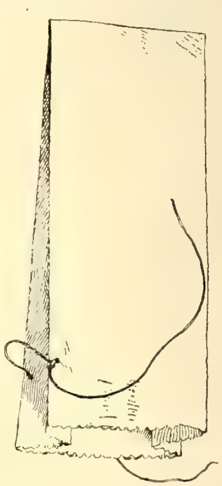


Fig. 5. Pollinating Bag.

alcohol. Into this alcohol I dip my tools as soon as I am done with any pollination, to destroy any pollen grains that may adhere to them, and which would be likely to interfere with a subsequent operation. Finally, behind a spring in the lid is a notebook. I find very small surgeon's scissors the best implement for opening flowers. The smallest steel crochet-hook is very useful in hooking out the anthers of many species. I make a spreader, for applying the pollen, out of a large pin. I cut off the head and flatten the other end, and then insert the large end into a handle. This makes a tiny scalpel, which is worth more for the purpose of applying pollen than any number of camel's-hair brushes. I have tried many bags, and several patterns have been manufactured for me, but none suit so well as the common manilla grocer's bags. For most plants the ¼-lb. bag is suitable. While the bag is still flat, a soft string is run through two of its edges about an inch from the open end, and the string is tied at one of the edges to keep it from falling out. Fig. 5 explains the method. The bags are dipped into water an instant a few minutes before they are used, so that they will be soft enough to tie snugly about the plant. It is now a pleasure to go a-pollinating.

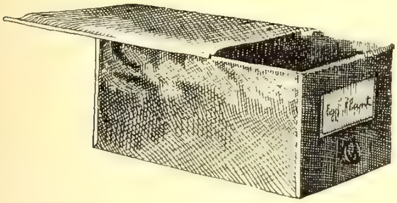


FIG. 6. RELIABLE SEED CASE.

RELIABLE SEED-CASES (Figs. 6 and 7).—It requires the loss of but one season's seeds by mice to convince the experimenter that tin seed-boxes are a necessity. Fig 6 represents a box which we find exceedingly useful. It is 9 inches long, 7½ inches wide and 5 inches deep. The cover slides back. There is a little rim or elevation on the front end of this cover, made by turning up the tin, which serves two or three good purposes. This rim strikes the pigeon-hole when the box is shoved in, causing the box to close tightly. It also prevents the box from going in too far, in case the pigeon-hole is too deep. Then when the box is shut and shoved in, the thumb is pressed against this lid while the box is drawn out, so that the box is self-opening and self-closing. These boxes are placed loosely in a pigeon-hole case, and may be taken out entirely if occasion requires. On the front of the box is a slot into which a label is dropped, and this label can be changed at any time. I have one case containing a smaller size of boxes, but we do not find them so useful as the size here described. This smaller size is 4½ inches wide and 4 inches deep.

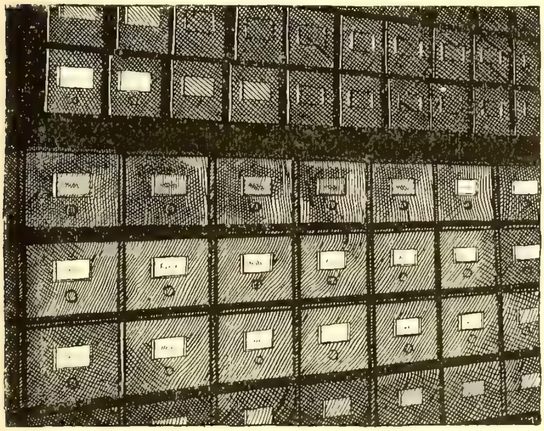


FIG 7. RELIABLE SEED-CASES IN POSITION.

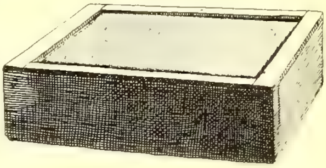


FIG. 8. SEED PROTECTOR

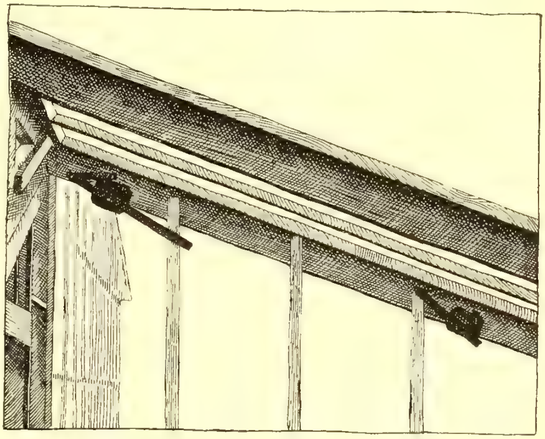


FIG. 9. A CHEAP VENTILATOR.

SEED PROTECTOR (Fig. 8).—This is simply a box a foot square, with a wire-cloth bottom, for setting over papers and pans of seeds which are being dried.

A CHEAP VENTILATOR (Figs. 9 and 10).—This is a modification and improvement of an old device. It is

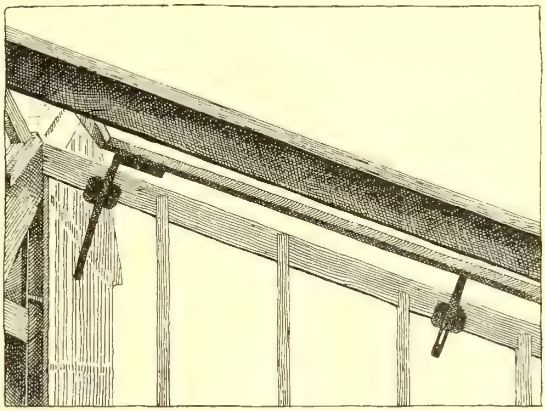


FIG. 10. A CHEAP VENTILATOR.

useful for raising the whole sash in low and cool houses. Fig. 9 shows the fixtures in place upon one side of the sash only. The upper lever has a joint, the top portion being 6 inches long, while the lower portion is about 16 inches. The lower lever has a slot three or four inches long, to allow the sash to slide. When the upper levers are pulled down, the sash is carried downwards until the top of the lower portion of the lever strikes the sash, when any further pulling of the levers must raise the whole sash, as shown in Fig. 10. The first downward movement of the sash allows the top of the sash to lie under a cap, to prevent leaking.

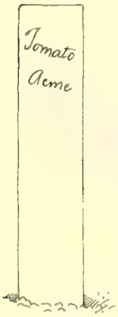


FIG. 11.

TWO GOOD LABELS (Figs. 11 and 12).—After considerable experimenting with field labels for vegetables and small fruits, I have adopted a soft and clear white pine label 2 ft. long, 3½ in. wide and 1½ in. thick, sharpened at the mill. These labels are primed with white lead, and the name is written on with a carpenter's pencil. The name is then more permanent than when painted on with a brush, while the pencil writing is expeditious, and it can be made neat. The labels which are used for annual plants are taken up in the fall, and during the winter the name is shaved off with a plane, another priming is given, and the label is new again; or the reverse side of the label can be used the second year. These make the cheapest and best garden labels and stakes I have ever found. They are large enough to be conspicuous, and are not easily displaced or broken by horse labor. In priming, it is important that the labels should be piled on their edges to dry, for if the faces come together they will dry so rough that they will not take the pencil.

A neat little label for specimen plants is made from the commercial primed garden stakes, as shown in Fig. 12. For the post I use Judson's 12-in. garden stake or label, and the cross-piece is made from his package label. The two pieces are put together with ⅜-in. brass escutcheon pins. I at first used iron pins, but they soon rust and discolor the label. These labels are frail, and are worth little for permanent use in our work.

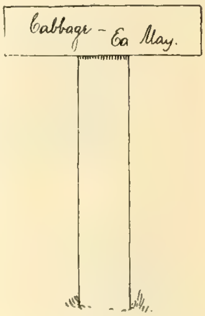

Cabbage – Ea May.

FIG. 12.

Cornell Experiment Station. L. H. BAILEY.

ROSE NOTES.

One new rose from France, exhibited at the fall shows, the *Mme. Pierre Guillot*, gives promise of popularity in its pretty buds, canary colored at the base and pink in the center. John May speaks very highly of it.

Madam Watteville has evidently come to stay. Its unique coloring and pleasing shape possess strong elements of popularity; just enough of the bizarre to take the fancy.

Madam Capucine, long neglected, is coming forward again as one of the most popular roses in the cut-flower market.

Wootton is a good rose, but in the hands of some skilled growers compares unfavorably with the *Bennett*. Side by side, the *Bennett* is more durable, of fairer shape and richer in color.

Why the *American Beauty* continues its great popularity is a mystery to many people. Fact is, it seems to meet the demand for showiness, though bordering on the grotesque in size and shape. It is in the fashion, and, therefore, "goes," just as big hats, bustles and other abnormal forms in feminine apparel.—L. H. E.

Marquis de Viviens deserves more attention from growers, on account of its fine buds and exceptionally beautiful canary-pink coloring.

A climbing variety of *Perle des Jardins*, originating at the John Henderson nurseries, is a very handsome variety, which will certainly stand high in its class. Habit like a Niel, but both foliage and flowers entirely characteristic of the Perle. The flowers are large and freely produced.

Among new roses *Madame Hoste* will be a favorite. Its shapely fragrant flowers are a clear primrose yellow. If the color were but deeper, it would realize Mr. May's long-looked-for ideal, a yellow rose with the shape and size of the Bride.

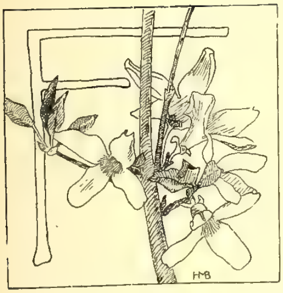
Mr. Evans' *Meteor* is beginning to attract more attention. It seems likely to prove highly satisfactory for winter forcing. The vivid color is greatly admired, and it has the long stiff stems fashion now demands. It will be remembered that *Meteor* was at first regarded chiefly as a summer bloomer.

The first early crop of hybrids was a failure in most cases. Owing to the wet, the plants kept on growing through the period of rest, and so did not properly ripen the wood. Consequently, when forced, a very large percentage of the plants went blind.

Some of the finest *Beauties* sent into the New York market are grown in a very light soil, almost pure sand, but with abundance of manure and ground bone. This seems rather odd, for when the rose was first distributed it was stated that it could only be grown to perfection in a very stiff soil. EMILY LOUISE TAPLIN.

FERTILIZERS FOR THE GARDEN—IV.

FORTY YEARS' EXPERIENCE—ACTION OF NITRATES.



FORMERLY it was thought that plants took up their nitrogen in the form of ammonia. Now it is known that they take it up in the form of nitric acid, the acid being combined with some base, such as lime, soda, potash, etc.

Ammonia applied as manure will do as much good as it did before the above fact was discovered. The only difference is, that we know that the ammonia is converted into nitric acid in the soil before it can be taken up by plants. Experiments are sometimes quoted to show that some plants can take up nitrogen in the form of ammonia, but the rule, at any rate, is as above stated.

Prof. Goodale, in *Garden and Forest*, says: "The beet and tobacco thrive best when combined nitrogen is afforded them in the form of ammoniacal salts."

So far as the beet is concerned the fact that such large quantities of nitrate of soda are used as a manure for beets grown for sugar in Germany and France, even in the absence of actual experiments, would seem to indicate that nitrates were better than ammonia.

Lawes & Gilbert's experiments on sugar beets were commenced in 1871. The same amount of nitrogen was used in the form of nitrate of soda as in ammoniacal salts. The following are the results:

	NO MANURE. *Bus. per acre.*	NITRATE SODA. *Bus. per acre.*	AMMON. SALTS. *Bus. per acre.*
1871	302	886	612
1872	314	854	606
1873	202	570	366
1876	260	826	566
1877	218	674	352
1878	140	404	174
1879	64	194	144
1880	180	560	394
1881	176	452	150
1882	184	660	246
1883	196	748	332

It is not necessary to give the results of later years. It should be understood that the unmanured plot has received no manure of any kind since 1846, and the plots, one of which had nitrate of soda and the other the same quantity of nitrogen in the form of ammonia, had no other manure. When this is understood, we think the above table will interest some of your readers. It should also be remarked that Vilmorin's White Silesian sugar beets were grown in the years 1871, '72 and '73. The manures were omitted in 1874 and '75. In 1876, and since, Yellow Globe mangel wurzel has been grown.

The year 1879 was the wettest season of the century, and this will account for the small yield. It is a surprising fact that with nitrates alone, with no potash or phosphates or ash constituents of any kind, 748 bushels per acre should be grown in 1883, after the removal of so many crops.

The experiment is still continued, the same manures being used year after year on the same land. The crop for 1888, the last yet reported, was as follows:

	NO MANURE. *Bus. per acre.*	NITRATE SODA. *Bus. per acre.*	AMMON. SALTS. *Bus. per acre.*
1888	54	814	266

There are cases where a given amount of nitrogen in the form of ammonia produces as large a crop as when nitrate is used. The ammonia is converted into nitrate by the growth of bacteria or a minute live plant in the soil. If this growth takes place early enough to convert the ammonia into nitrate as soon as the plants need it, an application of ammonia is just as good as an application of nitrate. But for many early crops, or for crops like beets, which seem to especially need a little ready formed nitrate to give the young plants a good start, the bacteria will not grow early enough in the cold soil in spring to furnish the nitrate.

This fact is one of the most important agricultural and horticultural discoveries of the age. It explains many of the old practices of experienced farmers and gardeners.

Many modern writers advocate applying manure to the soil in the fresh state. And sometimes this is the quickest and cheapest and best way to get rid of it. But experienced gardeners, to my own knowledge for 50 years, and probably for 500 years or 5,000, have found well rotted manure particularly valuable for certain crops. And he is an unwise man who ignores the well established facts of experience.

Forty years ago, Mr. P. Barry in his then just published book, "The Fruit Garden," speaking of the pear-leaf blight, said: "To avoid its evil effects as far as possible, the great point is to get a rapid, vigorous growth before midsummer, when it usually appears." In reviewing the book in the *Horticulturist* for July 1851, the lamented A. J. Downing singled out the above few lines for criticism. He admitted that it was important to get the growth before midsummer, but claimed that "It was a pretty well settled point among American fruit growers who have studied this subject that the great desideratum to *prevent* blight is to place the tree in a condition where all 'rapid and vigorous growth'—a growth always most liable to disease, and especially to the blight—should be guarded against, and a *moderate growth* of well-formed, short-jointed wood secured. It is because of the luxuriant growth of the pear on the rich soils of the west, that the blight is ten times more frequent and destructive there than in eastern gardens."

Here we have the opinions of two of the most distinguished pomologists of the age. Mr. Barry was, in our judgment, unquestionably right in endeavoring to secure an early, rapid, vigorous growth before midsummer. Mr. Downing was right when he said "*a late growth* is frequently caught immature at the approach of winter, and suffers thereby, either in frost-blight or in some other way."

The remarkable thing about it is that Mr. Barry, nearly 30 years before the discovery of the "nitrate fungus" should have come to precisely the same conclusion, in regard to the desirability of vigorous early, growth, as those of us have reached who have studied the question in the light of the recent facts.

When Mr. Barry wrote it was not an easy matter to manure the land so as to produce the desired early vigorous growth without running considerable danger of forcing a late succulent growth of wood and buds that would not mature in time to stand our severe winters. The best he could do was to carefully pile manure and let it slowly ferment for months till more or less of the organic nitrogen and ammonia were converted into nitrates, and avoid the risk of their leaching away by covering the piles with soil or sods.

We now know how to produce a rapid, vigorous, healthy growth in the spring, such as Mr. Barry desired, without the excessive growth in the fall deprecated by Mr. Downing. This is done by the direct application of nitrates early in the spring.

In his recent work on Nitrogenous Manures, Prof. Paul Wagner, director of the experiment station, Darmstadt, mentions a fact of great value in this connection. He says: "In my experiments a rape plant, freely manured with nitrate of soda, took up so much nitrogen that in its young state it contained no less than 6 per cent. of that element. Some weeks later the size of the plant was doubled, and the amount of the nitrogen in it was only 3 per cent., and still a few weeks later it was quadrupled in size and the quantity of nitrogen in it had sunk to 1½ per cent." "It is wrong," he continues, "to suppose that nitrate of soda acts on the plants while it is *in the soil*; the nitrate is very soon no longer in the soil but *in the plant*, and in this position it produces a striking increase in the size of the plant. As the plant-substance increases, the percentage of nitrogen contained in it diminishes continuously until it has reached the minimum, and then the action of the nitrogen, and with it the increase of produce, ceases."

This is an important fact. Plants get their carbon (sugar, gum, starch, woody fibre, etc.) from the carbonic acid of the atmosphere, but the nitrogen and the ash ingredients come from the soil. Not less than four-fifths of the dry substance of plants comes from the atmosphere. When Mr. Barry tried to get a rapid, vigorous growth of pear leaves early in the season, in order to ward off an attack of leaf-blight, his real object was to get the leaves full of sap, and a sap overcharged with nitrates, phosphoric acid, potash, etc., so that they could take carbonic acid rapidly from the atmosphere and make a vigorous, healthy growth.

It is the *chlorophyl* or the dark green coloring matter of the leaves, under the action of the sun, that enables them to get the carbonic acid from the atmosphere. In this country, as a rule, we have plenty of sun, but, especially early in the spring, our plants are deficient in chlorophyl. And this lack of chlorophyl is owing to a lack of nitrates. These are well known facts.

As we have before said, Mr. Barry must have found it difficult, if not impossible, to get a sufficient quantity of nitrates early in the spring without furnishing more manure than the trees required the latter part of summer or early autumn, when nitrification of organic matter in the soil, under the action of heat and moisture, often proceeds with great rapidity. But by the use of chemical fertilizers containing nitrates we can now obtain a rapid growth in the spring without producing a too luxuriant growth in the fall

It remains to be proved that the rapid vigorous growth before midsummer has a tendency to resist the attacks of blight, yellows and other diseases. Some of our authorities say it will not do so. But so far as we have seen they have made no satisfactory experiments on this point. Our own practical trials (not experiments) with nitrate of soda and other fertilizers seem to indicate that a rapid, vigorous growth of trees often enables them to resist fungus diseases. But there are exceptions. Last year the leaves on our apple trees, after the severe frost in June, were seriously attacked by fungus and rose bugs, and several acres of currant bushes, those which had had a dressing of nitrate and those which had not, were all attacked with leaf blight, and our peach trees, with and without nitrate, were all destitute of fruit. In previous years nitrate of soda had proved wonderfully efficacious in increasing the healthy growth of leaves on peaches, apples and currants, as well as the size, quality and quantity of the fruit. And even last year it had a decided effect on raspberries, strawberries and other plants that escaped the frost. On the whole, therefore, theory and practice alike warrant us in hoping that a rapid, healthy, vigorous growth early in the season will enable our plants, at least to a considerable extent, to ward off fungus diseases as well as attacks of insects. And this can be best obtained by the liberal use, in conjunction with phosphoric acid and potash, of fertilizers furnishing nitrates. The fact is, that more attention has been paid to the introduction of improved varieties of fruits, flowers and vegetables than to the science of feeding them. The pomologists and gardeners have got ahead of the chemists and fertilizer manufacturers. With plants as with animals, good feeding must go hand in hand with good breeding. JOSEPH HARRIS,

THE CHRISTMAS AND LENTEN ROSES.

THE hellebores, which are popularly known as Christmas Roses, have long been favorite flowers abroad, having been known and cultivated in continental Europe and England for many years. Occasionally they have been relegated to obscurity, only to be brought forward again into general notice by enthusiastic amateurs and cultivators. From the various types have originated many interesting hybrid varieties, and good cultivation has also lent its aid to improving the quality of some of the wild and cultivated varieties. It is only within the last ten years, however, that horticulturists have taken up in earnest the general cultivation and growth of this charming perennial, and the list of varieties has been largely increased in consequence. The variations in some instances are not decidedly marked, and would not be noticeable by the ordinary observer, but in the minds of expert amateurs and growers these distinctions are clearly defined, and each sort has some particular characteristic which commends it to our attention and lends it a charm. This is noticeably the case in the form of *H. niger*, in which type English growers have been particularly interested, and we find a number of varieties distinguished by local names, to particularize the source of origin. This system of nomenclature leads to more or less confusion on the part of horticultural layman, and for this reason, it is perhaps better in this brief article to refer only to leading varieties of a distinct type.

The hellebore cannot be classed among the essentially hardy plants which may be grown and made to flower in the open border in any of the northern states. This fact ought to be truthfully stated and understood. The flowers of *H. maximus* open in November and December, and these are followed during the winter by the flowers of other varieties until about March. The blooming period is closely followed by the growth of the foliage, and by March and April, at the latest, the full round of blossoming and growth has been completed and the plants are at rest until the succeeding fall. Naturally, this habit precludes successful cultivation in the open air. The plants in a well drained soil are hardy enough, but severe winter frosts destroy the flowers and ruin the foliage. In our climate, therefore, we are forced to give them the protection of a cold frame, where they are at their best, and are easily grown. In this position, there is no hardy plants which can compare with them. Their rare beauty, and their isolated period of blossoming, when all other out-of-door plants are denuded of bloom, are qualities so attractive that any trouble or care given them is well expended. The beautiful cut of *H. maximus*, the giant-flowered type, which is printed on page 63, is a picture of a handful taken from a plant in December, bearing perhaps fifty such flowers, and will emphasize, better than any other description, their exquisite purity and grace. The blossoms figured in the plate alluded to measured from two and one-half to three inches in diameter, most of the stalks carrying two of the pretty flowers.

Given a deep, rich, well-drained soil. and a frame with an exposure which will afford partial shelter from the burning sun-rays in mid-summer, the hellebores, if undisturbed, will grow vigorously, and in two or three years form large clumps, which will throw up quantities of flowers. These are the essential pre-requisites of success, briefly outlined, and there is nothing difficult or complicated, as may be seen in the cultivation of the hellebore. If a permanent frame is not convenient, it can be removed in the spring, but the plant must have its protection before severe frosts arrive, if a crop of well-formed flowers is to be gathered.

The foliage of the hellebore is strong and vigorous, and adds largely to the beauty of the plant, for in this respect nature rarely errs. The leaves of the various varieties vary much in form, those of *H. maximus* being the most distinct, but all are glossy, leathery in texture and deeply cut, while the flower stalks are densely mottled with purple, green and white.

Propagation is best effected by division of the crowns, and June and July are perhaps the best months for this operation, as the plants are then at rest. No hardy plant is more sensitive to disturbances than this, and at least two or three years are required to establish the crowns after division. Seed is freely produced, but it is slow and difficult to germinate. It should be sown under glass.

A brief synopsis of the leading varieties will be valuable, and only those are named which are positively distinct and amenable to general cultivation. First of all, in point of size and robust habit, is *H. maximus* or *altifolius*. Although a variety of niger, it is much larger in all its parts. The leaf stalks are over a foot long, the leaves broad and palmate, and very dark in color. The flowers are borne in twos and threes on a stem beautifully mottled, and are from two to three inches across, pure white, with a dense cluster of pale yellow stamens. In every respect this is a most exquisite bloom. In flowering habit it is the earliest, the buds pushing out in October and November.

H. angustifolius is closely allied to maximus, but flowers about January. It is also robust in habit, and its flowers are nearly as large as those of maximus, and circular in outline. Mad. Fourcade, another type of niger, bears smaller flowers, and is one of the freest flowering of all the hellebores, but later than either of the first two named. The blooms are pure white, with a bit of green towards the center. It is a very useful sort for cutting on account of its free flowering habit. The foliage is dwarfer and narrower than that of some others.

Then we have *H. caucasicus*, intermediate between maximus and niger major. The outside of the petals of this variety is tinted with a soft rose color, and the flowers come about January. The growth is vigorous, and altogether it is one of the best. *H. niger major* is perhaps better known than any of the above, and when true is of great value. Many inferior sorts are sold for the major type. Its foliage is finely cut, bright green and of dwarf habit. The flowers are numerous, and we have seen this plant flowering nicely in the open air in mid-winter, in especially sheltered positions during exceptionally mild weather. It is one of the oldest of the family, and well adapted to general cultivation, having a vigorous constitution. Besides these leading types of *H. niger*, are several others with slight differences of habit, but not essentially distinct. It may be added that *N. caucasicus* and *maximus* both have a delicate fragrance.

The Lenten roses, or forms of *H. orientalis*, are excessively interesting, for here we find a large group of hybrids with widely varying blossoms. These hellebores are the most robust of all, and carry their foliage until the new leaves supersede them, and this foliage is tall, dark green and broad. They are more easily established and in all respects better growers than any of the niger section. We have in mind clumps of them near here, three feet across, which bear from 100 to 150 flowers. Most of them do not show bloom until early spring, say from January to March.

Some of the leading sorts follow: Apotheker Bogren, with large imbricated flowers, of a rich purple rose color; *H. colchicus*, deep plum color; Commerzienrath Benary, white, freely spotted with crimson dots, and cup-shaped—this is one of the very best of all this group; Frau Irene Heinemann, rich purple rose, spotted with carmine red, and flowers very large; *H. roseus*, deep rose, a free flowering sort; Prof. Schleicher, white flowers, and a newer sort, highly spoken of. Many others in addition to the above, such as Gertrude Jekyll, pure white; P. R. Barr, S. C. Heinemann and Hoffgarten Hartwig, are quite distinct, handsome and worthy of a place in any collection.

In time some of our American plantsmen will gather together complete collections of the hellebore family and establish them here; certainly no plant is more worthy of the care and attention which may be expended upon it. In time, moreover, we shall find the hellebore more in favor as a commercial flower, but not until the propagation and growth of the plants are better understood on this side of the Atlantic. EDWARD L. BEARD.

Cambridge, Mass.

A BEAUTIFUL CARNATION.

At the Orange show, in November, was exhibited a new double white carnation that good judges declare to be the best of its class yet brought to the light for public inspection. It is a seedling, produced in the houses of John McGowan, Orange, N. J., and named by him the Miss Lizzie McGowan. Our frontispiece shows this beautiful flower in the best style of the engraver's art. The picture represents the bloom in natural size. In texture the petals are firm and durable, and are a pure white, sweetly fragrant. The flower has the valuable characteristic of not bursting in the calyx, a trouble too often spoiling otherwise good and beautiful carnations. It is a free flowering variety, bearing numerous large blooms, measuring 2½ inches in diameter. John Thorpe calls it the "best" white carnation.

GAS FUELS.

EVEN with the rapid spread of gas as a fuel for both heating and cooking, has come a very remarkable increase in the demand for gas. From letters received by The American Garden it is evident that great interest is taken by florists and owners of greenhouses in the matter of gaseous fuels. A number of florists already use natural gas in their greenhouses, and nearly all the manufacturers of steam and hot-water apparatus now furnish boilers adapted to burning gas. (See January American Garden).

It may be well, therefore, to ascertain, as clearly as we can without going into the technical side of the matter, just what is meant by gaseous fuel, and how such fuels should be used. There is, at first sight, an apparent confusion in the names of such fuels. There is natural gas, producer gas, fuel gas, illuminating and water gas, and there are a number of vapor fuels. These last are not gas fuels, but inflammable sprays or vapors made from oils. Some of these vapor and gas fuels are in greater or less degree of value in heating horticultural buildings.

We may begin with the oldest of the gases—common street or illuminating gas. The making of this gas is very simple and is at the same time expensive. For a long time it was the only method of making gas, and is still largely used in many of our cities. A coal, rich in gas, is placed in a retort over a strong fire and cooked. It amounts to cooking, but is properly called destructive distillation. That is, the gas is distilled out of the coal and the process destroys the coal, turning it into coke. The gas is cleaned or washed to free it from impurities, and is then stored in the holder ready for distribution through the street mains. This gas gives a luminous flame, and is a good fuel gas for warming greenhouses. The chief objection to it is the cost.

Natural gas is practically a wild gas found in the earth in vast quantities, and obtained by boring into the ground. It is an admirable fuel, and is used as such over a large extent of our country. Next to these come producer gas, water gas and fuel gas. These are technical terms, used to describe varieties of gas made in a number of ways in a great variety of gas-making plants that are commonly included under the general name of "gas producers." We need not here stop to examine these gases in detail. It is sufficient to know that coal, oil and steam can be by some of these methods made to give us gaseous fuels that are suited to boilers for steam and hot water. The term water gas is misleading. Gas is not made directly from water. Steam that comes from water may be turned into a gas, but it is no longer steam, for it is completely decomposed and destroyed. Coal will also give gas, oils will also give gas, and these, combined with the gas made from steam, form, in various combinations, the various gases known as producer gas, water gas and fuel gas.

Our supply of coal and of oil for making these gases is apparently inexhaustible, and of water for steam, there is clearly no end. Many people have thought that if water can be turned into steam and then be destroyed and turned into a gas, that the supply of water might some day give out. Every gas lamp or gas stove that burns gives back to the atmosphere water. Nothing is really lost in the world. The elements change, but the amount of material in one form or another is forever unchanged. Fuel and water are undoubtedly the fuels of the future. They give good heat, and they are cheap. It is estimated that some of these gases can be made for less than 20 cents a thousand feet. We need never expect to buy them at this rate of the gas companies! Gas companies must have their fat little dividends, and it is doubtful if gas fuel will be sold at retail for less than 50 cents, including the delivery through the street mains. It is quite possible, however, that the time will come when florists with very large houses may set up gas producers on their own land, and make their own fuel, and in that case they will undoubtedly obtain very cheap fuel, as they will get rid of the costly mains laid in the streets.

Closely allied to these gas producers are the new apparatus for burning the spray or vapor of oil. These appliances, by means of a blast of steam or of compressed air or both, produce a fine spray or mist of petroleum oil, and this vapor may be burned under a boiler and give a very great heat. Some of these vapor producers are closely allied to gas producers, and their products seem in some instances to be a mixture of gas and vapor. Gasoline vapor stoves for cooking are also in use in a limited way, but it is doubtful if they are just the thing for heating greenhouses. Some of these vapor fuels are largely used in manufacturing and in steam making, and under various names may some day be of use in our greenhouses for steam boilers.

It is yet too early to say what is to be the outcome of these various processes, but the interest in the subject is so great, the demand for improved fuels so extensive, that out of them all is likely to come something that will be just what we want. So far as gas is concerned, it is not so much the fuel of the future as of to-day. Gas can be made in vast quantities at little cost. Almost every month sees new improvements in the gas-making plants and in new methods of producing gas. A non-luminous heating gas is the florist's fuel—clean, safe, powerful, uniform and reliable. Only the cost stands in the way of its immediate universal adoption in our plant-houses. Every year, almost every month, sees something done to lower the price, and when the price falls gas fuel will come, and the long nights spent by the florist "tending fires" will be over forever.

How shall we burn gas? Burners and "mixers," as they are called when used with natural gas, are already in the market, and can be purchased very cheaply, or anyone can make one himself. The chief points are to give plenty of air for combustion and a good draft. In the Bunsen burner the air is mixed with the gas before burning, and this gives a larger volume of flame and a greater mass of hot air to flow through the pipes of the boiler. So far nearly all our gas stoves and gas heaters use the air and gas at the natural temperatures at which they may happen to be in at the time they burn. This is clearly not the most economical method. Both the gas and the air needed for combustion should be heated before they reach the burner.

The little drawing is designed to explain this matter of heating the air and gas before burning. The cylinder is closed at the bottom and opens at the top. The gas enters at the pipe marked 1, and passes downward to the burner, near the bottom of the cylinder. The air enters by the pipe 4, and passing downward escapes into the cylinder directly under the burner. At the side of the cylinder is a door for lighting the gas, and when the burner is started the door is closed. Now, both these pipes are over the gas flame and are heated by it. Both the gas and air are therefore hot when they reach the flame. The result is a longer, brighter and hotter flame; in other words, economy of fuel by causing the flame to give more heat for a given quantity of gas.

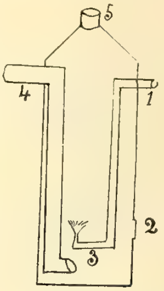


Diagram of Section of Ideal Regenerative Gas-Burner.

1, gas-pipe; 2, door for lighting; 3, burner; 4, air-pipe; 5, chimney.

When any subject attracts general attention, and when many improvements are being made at the same time in any particular field of science, it always happens that new improvements are announced that promise to do something for nothing. Curious stories of wonderful gas-making machines, that will manufacture water gas in a cook-stove for nothing at all a thousand feet, have appeared in print. We can abide in peace, certain that while cheap gas is coming, it will be and must be made by scientific processes in regular plants erected for the purpose and on a large scale. The larger the plant the cheaper will the product be, and as florists and gardeners we can only wait till the gas manufacturers are ready to give us what we want—cheap fuel gas.

Charles Barnard.

NEGLECTED NATIVE PLANTS.

A REVIVAL of interest in the wild garden has brought into deserved notice and appreciation many of our native plants, but there are some others, native in the southern states, for which I would like to speak a word in season.

My last and loveliest venture in this direction was *Lobelia cardinalis*, whose native habitat is creek sides, swamps and boggy places, so that, though I had admired it long, I was afraid that in my high and dry upland garden it would refuse to grow. But one autumn its glowing spikes of brilliant scarlet were tempting beyond resistance, and I transplanted it while in full blossom, making it as comfortable as possible in a partially shaded spot with a northeastern exposure. Strange to say, it grew! finished expanding the flowers on its spike, and sent up new shoots from the root which were green all winter, and gave each a brilliant spike of bloom in autumn. The cardinal flower is one of our richest colored natives. It has found its way into one florist's catalogue, and is surely well worthy a place in any garden. The seed vessels are large and conspicuous, and the plant increases from the seed quite rapidly and easily.

Sanguinaria canadensis is the old bloodroot, with fragile, starry, snow-white blossoms, disappearing so rapidly in the wake of the root-digger and herb dealer that unless it is taken into our gardens there is danger of its vanishing entirely. It is one of the earliest of the spring wild flowers, and is quite amenable to culture, given a loose, somewhat sandy soil and a partially shaded eastern exposure. The bloom is much larger in cultivated than in wild specimens, and being snow-white, six-petaled and shapely, with a center of golden anthers, it is a very "lovely, modest flower." The petals are not very persistent, and fall in three or four days, but new buds keep crowding up, and when flowers disappear, the thick leathery leaves of a silvery purplish green, with crimson stalks and veins, are very handsome.

Another wild plant with beautiful leaves is the *Erythronium Americanum* or Dogstooth violet. Early in the spring they come pushing up from the tiny bulbs which are found in somewhat damp and shaded places. Under favorable circumstances, when cultivated, these leaves will grow to a length of seven or eight inches; their shape is ovate acuminate, with a shining green surface, marbled and mottled with white and dark brown. The little nodding lily of pure lemon yellow, with center of dark brown stamens, is also very beautiful. Its petals are about four inches long, recurved, and the flower remains perfect for a long while. It can be forced into bloom very early, treated in the same way that Bermuda lilies are, with only half the heat which they require.

A writer in the London *Garden* recently called attention to another of our own native plants, which deserves more consideration and cultivation than it is at all likely to receive. The *Garden's* description is quite true and appreciative. "It is a strange fact that while many flowers of doubtful value are widely distributed in gardens, some real treasures, for no apparent reason, are overlooked. Such has been the fate of the lovely little foam flower, and though it is a perfectly hardy plant of rapid increase, flourishing in almost any soil and position, and has been in our botanic gardens for one hundred and fifty years, it is only now that it is becoming known. It is a plant of great beauty, both of leaf and flower; the little starry flowers are creamy white, the buds delicately tinged with pink, a good mass of them seen a few yards off having a close likeness to a wreath of foam. The young leaves are a tender green, daintily spotted and veined with deep red, while the older ones at the base of the plant are of a rich red bronze. Whether planted in a rock-garden or border, it is a beautiful and delightful plant. It is a valuable plant to pot in autumn, and force from a cold-frame in early spring." This "foam flower" is our *Fiarella cordifolia* or false mitrewort, a hardy perennial, very noticeable in winter on rocky hillsides by reason of its tufts of crimson leaves, and in spring by its masses of fluffy fringed white flowers. Planted in any garden soil, with the weeds kept down about it, it thrives and blooms finely. These native beauties have been selected from a long list, as being a few of the most neglected and most deserving.

LENNIE GREENLEE.

North Carolina.

CHRYSANTHEMUM DISAPPOINTMENTS.

PROMISE of a better display of chrysanthemums than had been seen in any previous year, opened the last season's shows. This expectation sprang from the fact that many new varieties had been put upon the market with such unstinted praise of their merits that many were induced to believe a new era was about to dawn, in which this fine flower would be seen in absolute perfection. This hope has been only partially realized, which might have been owing in some measure to the fact that last season was less favorable for the chrysanthemum than usual. At the same time it must be confessed that not a few of those well spoken of proved anything but satisfactory. Mrs. Andrew Carnegie has been fairly well tested in this neighborhood without, in a single instance, producing a good flower. In many cases the tips of the petals crumpled up before the flowers were fully expanded, and when at their best, these organs incurved so as to conceal the only attractive color in the flower. But, notwithstanding the numerous failures to grow this variety satisfactorily, it rests upon undisputed evidence that it has been seen in a high state of perfection. But from the experience gained last season it might well be doubted if ever it becomes a general favorite. The form of the flower is good, but there are other elements of beauty than form in the makeup of a perfect flower, and in some of these it is sadly wanting. Those who have the means and the patience to wait upon this capricious individual by sedulously attending to shading her from intense sunlight, and sheltering from rain and dew, might be able to obtain flowers of considerable beauty. But this looks like waste of time, especially when there are so many varieties of rare merit which can be brought to a high state of perfection with little more than ordinary care.

Mrs. Alpheus Hardy has also disappointed many by the way she has acted. Growers were early made aware that she was constitutionally delicate, and required the utmost kindness to bring her up to the best possible conditions. But even by the strict observance of the laws of health she refused to grow with sufficient vigor to produce flowers in a remote degree like unto the fine illustrations shown in catalogues. Other varieties which created great expectations have also fallen short of the high standard they were said to reach. But it is hoped some of them will do better when good plants can be had to begin with instead of the small and soft plants, the product of a few weeks forcing. Aside from these there are quite a number recently introduced so good that no one need be at a loss to make up a collection the like of which could not have been brought together only a few years ago. Probably the chrysanthemum has nearly reached its limit in size, for there is in the vegetable economy such an adjustment of parts as to result in a well balanced whole. We dare not hope to see a blue chrysanthemum, but it is not unreasonable to expect other combinations of colors common to the genus of greater novelty and beauty than has yet been seen.

New Haven, Ct. A. Veitch.

A NEEDED EXPERIMENT.

A NOVEL IDEA.

OUR experiment stations are now under way and we expect them to aid the farmer. There are many things which they might experiment upon, so many, in truth, that the common and practical subjects are likely to be overlooked. I often think that the experimenters study the things which they like best, and not always the things which are the most valuable. I presume, too, that they have more suggestions than they care for or can use; yet I am going to make another. The subject to which I would invite the attention of the stations is exceedingly important, and it seems singular that it has not already occupied the attention of scientists.

It represents a crop of commanding importance in all parts of the states north, and is a subject upon which every farmer in the land wants more light. If some one could illuminate it, he would be at once considered a benefactor of his race, to be mentioned alongside that other rare individual who can make two blades of grass grow where but one grew before. The potato is an edible tuber, and it grows upon all kinds of soil, and is cultivated in a multitude of ways by several millions of people. Almost every one of these many individuals has some notion of his own in regard to potatoes. Some notions are no doubt better than others, and some worse, but none of them are any too good, and some are not good enough. They all need investigation, and some subjects need it soon. At any rate, the one I am talking about is new and vital to the potato; and the press of the country can do no better thing than to unanimously call attention to it and ask for elucidation.

I suppose that the professors in our experiment stations are at this season trying to find something to experiment about next summer. Certainly it is none too early to begin to think about it. Then why not take up this subject? But there should be some concert of action on the part of all the stations, commensurate with the importance and novelty of the subject. I do not want to presume to plan out work for people so much wiser than myself, but I simply suggest from the attitude of one who has to dig in the soil to get his potatoes. Now, the question I want to propound is this: How shall we cut potatoes for seed? I know of growers who cut to a single eye, and some who do not cut at all, and some who do as it happens to come handy. Now, how are we to know who is right? And what better work is there for the experiment stations, considering the number of potatoes grown in every county every year? I have spent much time ciphering out how much this fractional township of Mill Creek loses every year in planting potatoes which are not cut up fine enough, and I believe the amount is three or four thousand bushels. Then what must be the loss over the whole of this great country? It is singular, as I said before, that no one has taken this matter up. Experiments could be so planned that a multitude of tables could be made of the results. I am aware that great skill is required to carry out such experiments as these, but I feel sure that our experimenters are equal to it.

Suppose that each experiment station select six plats of ground, all exactly alike in size and kind, and on them plant potatoes in different ways. Let plat 1 be planted with pieces of one eye, plat 2 with pieces having two eyes, and so on up to five eyes. Then on the sixth plant whole potatoes. Then if accurate measurements of growth were taken every day during the season, and all the potatoes were weighed in the fall, I am sure the experiment would give many figures, and afford great opportunity for discussion. Certainly, much literature would be added to a very important and much neglected subject. R. T. Choke.

SOME FRENCH ORCHID HOLDERS.

The unsightly shapes of the receptacles that orchids are commonly grown in with us, have long been an irritation to flower lovers with æsthetic tastes and have perhaps been an unconscious cause of the little interest felt in these plants by many worshippers of the floral kingdom.

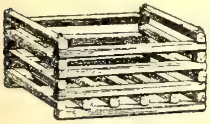


FIG. 1.

The use of baskets of pitch pine has long been general and meets the hearty approval of raisers. We give a number of pictures reproduced from *Le Moniteur d' Horticulteur*, showing shapes and construction of some now made and sold in France. The most common and ugliest form is the square bottomed basket (Fig. 1), seen in all parts of the world, and used for growing dendrobiums, cattleyas, most of the oncidiums, etc. A similar basket, or panier as the French call them, of twice the usual height, they especially recommend as suitable for the Indian orchids, such as ærides, saccolabium, vanda and angræcum. For phalænopsis, the high tubular or cylindrical form (Fig. 2) is considered the best. For those who are willing to incur a little extra trouble or expense, they recommend the single (Fig. 3) or double octagonal forms which are especially adapted for strong specimen plants. For stanhopea and acineta, an especial shape is made (Fig 4), with a bottom of copper wire through which the flower shoots can find ready egress. The hamper form (Fig. 5) and the log form (Fig. 6) are said to be better than the heavy logs or pieces of bark on which the Brazilian oncidiums, cattleyas and lælias of spreading form are grown. The hopper form (Fig. 7) and the manger form (Fig. 8) are especially useful for the decoration of walls, and ornamental foliaged plants of fern-like or trailing habit are mingled with the orchids in the happiest manner. These paniers are found admirably adapted to the culture of bromeliads of small size, many ferns such as adiantums, certain polypodiums, davallias, and the selaginellas. They can be made the most pleasing additions to greenhouse and conservatory, the upper parts of which are often bare of vegetation. The pot (Fig. 9), cup and conical forms (Fig. 10) are less to be recommended, as they render the cultivation and arrangement of the plants more difficult. The cubiform (Fig. 11) is adapted to those specimens of large size and strong growth that stand upon the floor, only requiring to be raised on the short legs, or it can be made in small sizes if any one has a fancy for it. All of these can be bought in France, but we know of no dealer in florist's supplies who keeps them all in this country; however, they can readily be constructed. Do not make the mistake of oiling or varnishing them, as is sometimes done, as then the surfaces are rendered unsuitable for the plants to attach themselves, and are detrimental to their well-being. Teak wood is recommended by foreign authorities as most desirable for use in constructing orchid holders, but it would be difficult and expensive to get it in this country. While it is desirable to have wood that does not decay readily, it seems to make little difference to the plants. Oak, cork, pottery, the trunks of tree ferns, etc., have all been most successfully employed, as convenience dictated. The ordinary clay pots, subject however to some variation in shape, are now the most common among our orchid raisers, and from a cultural point of view are unobjectionable, but their appearance is then so similar to plants that live in the earth that one of their chief distinctions is lost to the orchids. Nature adapts them so beautifully to their natural surroundings that few people realize that their odd rather than beautiful appearance is owing to our way of looking at them in badly placed positions; experience will give us better knowledge.

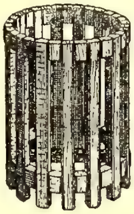


FIG. 2

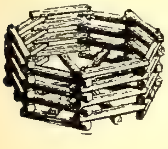


FIG. 3.

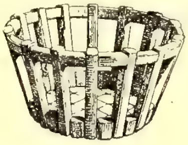


FIG. 4.

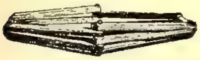


FIG. 5.

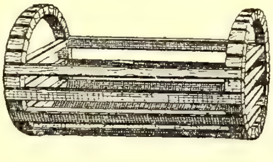


FIG. 6.

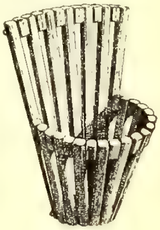


FIG. 7.

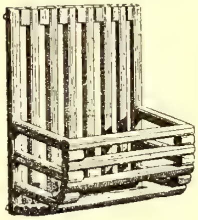


FIG. 8.

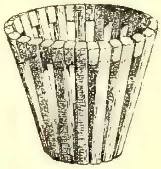


FIG. 9.

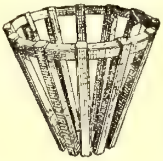


FIG. 10.

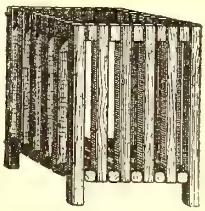


FIG. 11

SEEDS AND SEED-GROWING.

CARE OF STOCKS, AND HOW THEY ARE IMPROVED BY CROSS-FERTILIZATION.

Fourth Paper.

IN seed-saving we may never lose sight of the principle that applies alike to every class and variety—namely, in selecting plants for seed production the most healthy must always be chosen, and these be so insulated as to have no weak plants of the same species, or even genus, in the vicinity, lest the pollen, carried on the wings of the bee, or the wings of the wind, fertilize the flowers and produce a less vigorous progeny. Vigor or weakness in the plant is hereditary, and will be transmitted as surely in the plant as with the animal. It is also important that all stock plants should be so isolated that it will be impossible for the pollen of an inferior strain, as regards quality, to come in contact with their flowers, as this would counteract all the efforts made by selection to develop a higher type. The same rule will apply as to earliness or lateness, whichever character may be desired.

In short, whatever character may be desired in the offspring, the elements must be sought in the parents. If new varieties are desired, an intermediate form of shape, color or quality of flower or vegetable, select for parents the best defined types of existing varieties—those of the most positive characters in direct opposition to each other. For instance, a cross between a pure white and a deep crimson flower will be quite likely to produce flowers distinctly marked and defined, while neutral tints, beautiful as they are, will be likely to produce others wanting in real character. The same is true with fruits. A cross between a well-defined sweet and a positively sour apple will be much more likely to give in the offspring an intermediate variety of excellent flavor than if a cross had been effected between two good varieties of similar excellence. It may be desirable to unite the strength of one plant with the quality of another in order to secure a variety possessing the properties of both. This will be the subject of a future paper; in this we only refer to continuing of varieties that now exist.

HYBRIDIZATION OF THE PEA.

An interesting illustration of hybridization is shown by Mr. Knight, an English horticultural writer, who died about 1838. The following account was published in 1810: "Blossoms of a small *white garden pea*, in which the males (anthers) had previously been destroyed, were impregnated with the farina (pollen) of a large *clay-colored kind with purple blossoms*. The produce of the seeds thus obtained were of a dark grey color, but these, having no fixed habits, were soon exchanged by cultivation into a numerous variety of very large and extremely luxuriant *white ones*, which were not only much larger and more productive than the original white ones, but the number of seeds in each pod was increased from seven or eight to eight or nine, and not unfrequently to ten. The newly-made *grey kinds* I found were easily made *white* again by impregnating their blossoms with the farina (pollen) of *another white kind*. In this experiment the seeds, which grew towards the point of the pod, and by position were first exposed to the action of the pollen, would sometimes produce seeds like it in color, whilst those in the other end would follow them.

"In other instances the whole produce of the pod would take the color of one or other of the parents; and I had once an instance in which two peas at one end of the pod produced white seeds like the male, two at the other end grey ones like the female, and the central seeds took the intermediate shade, a *clay* color."

When any desired change has been effected by this method, it is important to perpetuate such of the varieties produced as show a marked change in the line of improvement, either as regards size, quality or productiveness. This can only be done, or is best done, by continuous planting in the same kind of soil in a given locality and, so far as possible, under similar conditions of cultivation, more particularly in the use of manures. Improvement will ever follow selecting the best for seed, and giving the crop a generous and uniform treatment. Degeneration will as surely follow neglect in any of these particulars.

In the development of a new variety it matters not what it may be. Always select the best for seed purposes, and plant the product where it will not become contaminated by cross-fertilization with an inferior stock or strain. All kinds of garden vegetables, as well as grains or root crops, may be materially improved by the above-described methods. It is, moreover, a work both interesting and profitable.

BY CROSS-FERTILIZATION OF POTATOES

they have been vastly improved, both as regards quality and yield. The efforts made by specialists in this direction have been of incalculable value to the grower. Now, how shall he reap the greatest advantage from the ntroduction of a new variety? First, he must disabuse his mind of the idea that degeneration will follow the planting of a given variety in the same soil; that a change of seed is necessary.

It is no wonder that these opinions exist when it is customary with farmers to sell or consume the best and to plant from the refuse. It is a well-known fact that on a given soil some varieties will give a greater yield than others. Having determined which is the better, the next move is to select for stock the best the field affords. This operation is attended with considerable care, if well done. All growers have observed that some hills will turn out more potatoes than others, even though the conditions are the same. This is noticeable in the vines. If before digging they are strong, vigorous and branching, the tubers will be larger and better shaped, as well as more in quantity. Select the best from such hills only, in future seasons follow this method, and the yield will be far greater and the size of tubers be increased. This practice is followed by some farmers with whom we are acquainted, and others in their immediate neighborhood look to them for stock seed.

Let me state one instance to show more clearly the importance of the method. Upon the introduction of the Early Ohio, George W. Hallock & Son, of Orient, Long Island, commenced to grow it, and so satisfactory was the crop they have continued to do so, always selecting in the manner described their stock seed. The result was they have established a new type, differing somewhat in shape, and earlier and more productive.

THE SAVING OF CORN FOR SEED

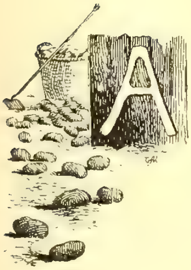
is an important work, and one generally overlooked. It is the common practice to select the best ears at the time of husking. This is good so far as it goes, but is attended with two disadvantages. One is the selecting of the largest ears, of which in general only one grows on a stalk, which lessens the produce; and the other is the liability of selecting those that ripen at different times. It is natural to suppose that the grains of stunted or sickly corn, even though the ears may attain a large size, necessarily partake of the weakly disposition of the plant which produced them, and that this product cannot be so fine as that which grows from seeds of strong and healthy plants. For this reason the ears, whether of sweet or field corn, should be selected before the stalks are cut, being taken where there are two long and well-filled ears on a stalk of low growth, with the ears near the ground. The whole plant should, by the length and breadth of the leaves and the size of stalk, indicate perfect health. Earliness should always go with productiveness; therefore the first ears to ripen are the ones to select for seed, and all should be gathered at the same time in order that there may be uniformity in ripening united with earliness, which is of the greatest importance in field culture.

While there has been within the past fifty years a marked improvement in the earliness of corn, evenness, particularly where but little is grown for market, has been sadly neglected, and the want of uniformity in the time of flowering has caused many short crops, or imperfect ears, that have been attributed to far different causes. Observation will show plainly that the grower who secures the largest yield is the one that gives the most particular attention to the selection of seed; and, further, the corn that brings the highest price in the market is the one in which grains are of uniform size and color, results of careful selection.

What has been said of the classes mentioned is equally true and applicable to all others. The importance of selecting the best applies to every variety of seed sown, and after securing it, its perpetuation is equally important, and more so its improvement. While there is a limit in development there is but little danger of our ever reaching it, and only by persistent effort can we keep our stocks from degenerating. Perfection may be reached, but by no other road save the one leading to it —viz., selection.

C. L. Allen.

POTATOES FROM NORTH AND SOUTH.



A CAREFUL reading of the article by L. H. Bailey in the November Garden fails to convince me that the "influence of latitude upon potatoes" has so much to do with the yield as he claims. One experiment fails to prove anything conclusively. Were the potatoes he procured from T. C. Davenport's warehouse Pennsylvania grown? Mr. Davenport claims to deal in eastern stock, mainly Prince Edward Island and other stocks grown far east or north, and I have no reason to doubt that this is the case, as I have repeatedly bought through my agents, for sale or planting in the spring, from Mr. Davenport, and I have never had any reason to think they were not eastern or northern seed as claimed.

Careful experiments conducted in this vicinity by conscientious and painstaking experimenters have proven conclusively that the best seed potatoes to plant are the second crop potatoes grown on the Delaware, Maryland and Virginia peninsula and perhaps farther south. By "second crop" is meant the matured early potatoes planted in February or March. After maturing and being dried or cured, they are planted again, producing a moderate crop of far finer tubers late in the season than can be grown in the north. Were they grown in sufficient quantities to market, they would sell for more money in Philadelphia or New York markets than any northern potatoes offered, but so far as we know, none are sent to the larger markets, though at least one dealer in Maryland makes a specialty of them and is able to sell them at remunerative prices.

The fact is that the talk about northern seed potatoes being so much superior to southern is "all bosh." It is and has been the custom for a long time for our border state farmers to send their potatoes to northern markets in the spring to their commission men and receive, perhaps, fifty to sixty cents per bushel for Early Rose potatoes, and order from the same commission men northern-grown seed potatoes for which they were compelled to pay $1 to $1.25 per bushel.

An amusing true story, is told of a Caroline county, Maryland, farmer who shipped some Early Rose potatoes to his Philadelphia commission man and at the same time ordered a barrel of the best northern-grown Early Rose potatoes for planting. In the meantime his jack-knife, which he highly prized, had been lost and could not be found, but when his barrel of seed was unpacked his knife was found among the potatoes! It was the identical barrel of potatoes sent by the farmer to the commission man, and returned as "best northern seed potatoes." Seed potatoes that have the most *unexpended vitality* will give the best results. Potatoes grown in the far north and kept there or elsewhere in a dormant condition till planting time have the most starch and other nutriment for the young plant. If their vitality has been expended in sprouting, as is often the case, they cannot support the young plant until it is able to draw its nourishment from the soil, and it fails to produce a full crop. This is why second crop potatoes, grown where second crops are possible, give the largest yields.

Delaware. R. W. HARGADINE.

[NOTE.—The potatoes procured from T. C. Davenport, in the tests under discussion, were obtained purposely for the experiment, and were Pennsylvania grown, as stated in the article in THE AMERICAN GARDEN for November. —L. H. B.]

HOW MUCH SEED SHOULD WE SOW.

Professor Bailey's comments on my remarks in the December number of THE AMERICAN GARDEN, page 455, somewhat surprise me. He says: "Some of Mr. Harris's comments are wide of the mark and demand modification in the interest of a record of facts." But he does not say in what respect they should be modified. The point I wished to make was that no experiment has been made. Many of our agricultural and horticultural papers have quoted Professor Bailey's bulletin on this subject, and evidently considered what he calls a "record of facts" as an "experiment." No experiments were made. All that Professor Bailey did was to sow different seeds, and ascertain the quantity sowed. So far, so good. If others would do the same thing and give us a record of the facts, it would be found that some sowed more and some less (of certain seeds), but a thousand of such observations would not be worth as much as a dozen well planned and well tried experiments, such as Professor Bailey is capable of making.

Professor Bailey says that he sent circulars to 50 truck gardeners on Long Island, asking them how much seed they sowed on given areas of land. This is a good thing for an editor to do, but we are looking to our experiment stations for actual experiments, and not for the opinions and practices of farmers and gardeners.

Of the 50 gardeners, Professor Bailey tells us that "eight parties gave definite replies," and he tabulates the results and makes no comments. None are needed. If the whole fifty had replied, the table would have been useful as a "record of facts." But those of us who have had the most experience are looking to the experiment stations for definite information. We know the need of it, and we do not care about votes and resolutions unless we know who is voting. At a meeting of the N. Y. Dairymen's Association, the late Professor L. B. Arnold offered in sober seriousness the following resolution: "Resolved, that green corn fodder is an excellent food for cows"; and the resolution was solemnly passed, the voters evidently thinking that the cows after that must give lots of milk (when fed corn fodder). The fact is, it is easier to write and talk and pass resolutions than to make careful and repeated experiments. But this is not what we want.

In regard to peas I said, "many of us make the rows three inches wide, and if the peas stood three abreast they would stand 2½ inches apart in the row." My object was to show that Professor Bailey sows his peas decidedly thin. The printers made me say "rows" when I wrote "peas," and Professor Bailey seems to think I make rows three inches wide and drop rows abreast. Of course I do nothing of the kind. For a garden crop we make the rows from three to four feet apart, according to the variety. We set a line and make a row about three inches wide with a hoe, and drop the peas, one in the middle and one on each side, and about an inch apart in the row. This would take nearly three times as many peas to a given length of row as Professor Bailey sowed. Now whether Professor Bailey is right or whether I am right is precisely what we want to know.

It is one of the questions we want our experiment stations to answer.*

In the report issued from the "Office of the Experiment Station," at Washington, Professor Atwater says that Professor Bailey "gives practical directions regarding the quantity of seed required for a given length of drill. Careful records of the quantity of seed used for those vegetables ordinarily sown in drills *show* that the quantity required is usually much less than that recommended by seedsmen."

Now this is precisely what they do *not* "show." All they show is that in the case of peas, Professor Bailey sows peas in rows thinner than Peter Henderson in "Gardening for Profit" recommends, and far thinner than many others sow them. I have myself sown peas for nearly fifty years. I sow thicker than Professor Bailey; but what of it? Professor Bailey may be right. One thing is certain, however; he will not convince an old gardener that he is wrong without better evidence than has yet been adduced.

From the first year THE AMERICAN GARDEN and its predecessors, the *Gardeners' Monthly* and the *Horticulturist* were published, until now, this subject has been discussed. In the first volume of the *Horticulturist* that I happened to lay my hands on, (1851) "Old Digger," who I think Mr. Lucher once told me was A. J. Downing himself, writing about peas, says: "And what is the common way? somebody asks who has never planted a pea in his life. It is as simple as ruling a copy book. You have only to mark off the newly dug ground with straight lines (2½ feet apart if you are planting early peas, or 3½ if late ones) open a drill about an inch deep with a hoe along these lines. Then drop the peas in this drill about an inch apart. Some persons plant only a single line of peas in the drill, others make the drill as broad as the blade of the hoe and scatter the peas an inch apart throughout the whole, and I recommend the last way as giving the largest crop."

When peas are planted three feet apart in the rows, one quart of peas to 100 feet of row is none too much. If the rows are two feet apart, of course they should not be dropped so thick in the row. In this section we grow many acres of peas for the canning establishments, and we drill them in with an ordinary grain drill, in rows seven to nine inches apart. In such a case a pea every two inches in the row would be thick enough, and even then we should have far more pea plants on a given area of land than any of us usually sow in the garden. My opinion is that, as a rule, we do not sow our peas thick enough when planted in garden rows three feet or more apart.

Moreton Farm. JOSEPH HARRIS.

[* NOTE.—It is apparent that Mr. Harris and Professor Bailey are talking about very different things. Mr. Harris is speaking of broad rows in which the peas are dropped "one in the middle and one on each side, and about an inch apart in the row"; while Professor Bailey experimented with drills, the peas being dropped every four-fifths inch in a single series. The latter, therefore, sowed the peas thicker, so far as juxtaposition of peas is concerned, while Mr. Harris uses more seed to a given length of row.—ED.]

CULTIVATION OF ASPARAGUS.

BY THE ORIGINATOR OF CONOVER'S COLOSSAL.

CLEAN, rich, light loam soil that will not pack or bake is required for asparagus. A good heavy sod plowed under is good, as it makes a bottom for the roots to feed on. It requires strong, coarse manure under it; and as large stalks are the requisite in order to obtain high prices, the roots should have plenty of room to spread. The roots, after 6 or 8 years, will have grown 8 to 12 feet in all directions and 3 to 4 inches thick, all matted together. If planted closely, small, spindling shoots will result. By planting a good distance apart, as many shoots cannot be cut from the same ground, but the sprouts being larger, more bunches will be secured. These heavy ones sell more readily, and at twice or three times the price of the light weights, and cost less to cultivate, cut and bunch.

Plough the ground thoroughly, and deeply. Strike out a deep furrow 5 feet each way—6 feet is better if you want your bed to improve and last for years—making your crossings about 10 or 12 inches deep. Then put in plenty of good coarse manure, tread it well down and cover with about 2 inches of soil. Set the roots on this, spreading them well. They should be 6 or 8 inches below the surface. Then throw a furrow over them, from one side. When the rows become weedy or need covering, throw a furrow on from the other side, thus killing the weeds and keeping the ground loose. All the attention the plants require is that the ground be kept clean and loose. After the roots are well started, give a good dressing of stable manure, and plow in between the rows, using care not to wound the crowns.

In putting out, use 1 year old roots; the best varieties are Conover's Colossal and Lesher's Mammoth. The depth, 6 or 8 inches, is to allow of light plowing over the plants, or cultivation in the spring without injury. In order to strengthen them, let the plants go to seed; but before the seeds are ripe, mow off and burn, as the seed will stock the ground with young plants, like weeds. At the last ploughing or cleaning, plough in a good coat of manure and sow rye, letting it grow large enough to cover the ground. The rye keeps the ground warm and prevents the surface from blowing away in winter. Plow the rye under in spring, as a fertilizer. The second spring give a dressing of guano, hen manure, or bone; cultivate it in and plough up the middle, using stable manure between the rows and covering it well. The cutting will last about 4 weeks, after which apply manure and clean out all weeds and grass, so as to get a strong growth of roots for the next season. If cut too late, the root is weakened. To hasten the plants in spring, throw a light furrow away from each side of the crown, to let in the sun and air. After cutting two weeks, throw the furrow back again to destroy the weeds and loosen the soil.

Good strong Cuba bass is best for tying. Put one 3 inches from the top, another 4 inches below. Use a bunching mold to make the bunches uniform in size, and tie tightly, so that they will not loosen in transportation. The heads should all be even, and the butts all cut off square. Cull the sprouts, taking out all small or crooked ones, which may be put in bunches and sold as cullings.

Get a knife made at the blacksmith's of sheet steel $\frac{1}{16}$ of an inch thick, 1½ inches wide, and 15 inches long. Bend it lengthwise like a carpenter's gouge, put on a handle and grind the round side off about 1 inch back from the end, so as to have the cutting edge on the inside of the knife. Leave the outer corner ⅛ inch wide without sharpening, but grind it off to prevent injuring adjacent sprouts. The bunches should be 8 to 9 inches long and 4½ across the butt. Asparagus can be cut when 3 inches above the ground, but is better when 5 or 6 inches long, as the green part is all that is eaten. But it is necessary to leave on some of the white butt as it holds the moisture and makes a solid bunch to tie and handle. In cutting, take the sprout in the fingers, run the knife down close to it, the hollow side next the sprout. When at the proper depth, slant the knife by moving the hand away and cut off the sprout. Cut all spindling sprouts, as they check the growth of the larger ones. The sprouts should then be washed by dipping the butts in clean water, but do not wet the crown, as the water mixes with the gum in the crown and hastens decay in the bunch.

For shipping, make crates as follows, to hold two dozen bunches: The two ends and one middle piece are 12 inches wide, 18 inches long and ¾ inch thick; bore four one-inch holes near the top of the end piece for handles. Use half-inch boards for bottom and 6 inches up on each side. Make the bottoms entire. Or the crate may be 30 inches long, with slats 1½ or 2 inches wide and the same length as the bottom, for upper part of sides and top, with spaces between for ventilation. Place 2 inches of thoroughly wetted moss or grass in the bottom of the crate; then stand the bunches butts down on it, crowding them close together. When full, crowd the bunches together again. This will keep the butts moist and the heads and tops cool. Leave a space of one inch or more between the heads and cover for ventilation. To raise the young roots, plough the ground deeply, run out furrows two feet apart, fill with well rotted manure; turn a furrow over the manure and drop the seed two or three inches apart in the rows, in a straight line, Cover the seed about ½ inch deep and tread down. When the plants are up, clean them out, and thin to about 4 inches; keep the ground clean and loose by the frequent use of some good fertilizer. One pound contains 10,000 seeds.

S. B. CONOVER.

CANNING AND PRESERVING.

THE SKILL REQUIRED IN CANNING—METHODS OF EVAPORATING—COST OF EVAPORATORS—QUALITY OF STOCK USED—THE CO-OPERATIVE PLAN.

Fourth Paper.

THE PREVIOUS papers have dealt more largely with canners than with any other branch of the allied industries. This seemed to the writer expedient in view of the fact that canning demands more workers to properly conduct it, than do the other branches of the work. As a matter of fact, evaporating employs considerable help, but not for so long a period as canning, and the processes of canning require that the majority of the help shall be skilled in their work. Take, for example, the heating of the pulp in the manufacture of tomato ketchup; this process requires one or more men who, from long practice, can tell at a glance whether the pulp has reached the proper condition for further manipulation. So are there other branches in this line of work, the lack of proper help to manage which would result in serious losses.

The primary object in preparing these papers has been to answer inquiries which have been put to THE AMERICAN GARDEN regarding the practicability of certain growers in several localities establishing and managing canning and preserving factories, with a view to finding a way out of the difficulties arising from the overproduction alleged to exist in these localities. Having such a purpose in view, it is but just to the inquirers that we tell of the discouragements as well as the encouragements to be found in this business. In the canning of corn and other vegetables it is largely a matter of complaint that the industry is declining, owing, as a rule, to sharp competition; but it is certainly worthy of note that where the decline may be traced to this particular source, it is almost wholly with inferior goods. True, there is strong competition among the manufacturers of superior products, yet the price netted is sufficiently large to give a fair profit.

The cause has been given as low prices, caused by competition; yet after careful investigation, we are of the opinion that the real cause is nearer the inferiority of the goods than anything else. As evidence, it may be stated that but little of this inferior product of the canning factory is sold, compared with the quantities placed on the market. The reason for this is easy to see; that portion of the consuming public who buy canned goods are heartily tired of eating field corn, unripe tomatoes, field peas, etc., and prefer to pay a higher price for canned goods, or stop using them. This is an encouraging state of affairs in so far as it shows a knowledge, on the part of the public, of better things, a point of education brought about by the producers of and dealers in superior products. There can be but two endings to this state of affairs, and they are practically the same. Either the people who put this inferior class of goods on the market will be driven out of the business from lack of trade, or they will be compelled to put honest goods upon the market at reasonable prices. Either of these results can but be welcomed by the consumer.

The evaporating of fruits now demands our attention. This industry has not as yet reached the proportions of canning, nor is it likely to, because of the apparent dislike of the public for evaporated fruits. This dislike is perhaps natural, when we consider that the flies found in dried currants are not at all desirable as an article of food. Then, too, most of us know that the quality of fruits which are evaporated is not usually of the best. For example, large quantities of apples which were formerly considered the lawful prey of the "still" are now evaporated with all their imperfections.

As noted in a previous paper (page 436, December), questions 12 to 18 referred exclusively to evaporating.

12. Do you evaporate fruits?

13. Does this process give the grower a better price for his products than any other?

14. What is the capacity of, say, a $5,000 evaporating plant?

15. Have you tried evaporating or canning on the co-operative plan, *i. e.* making the grower a sharer with you in the profits of the business?

16. Has it paid you?

17. Has it paid the grower?

18. Is it mutually satisfactory in every sense?

Of these questions the most satisfactory replies were received from Western New York, largely Wayne county, which is widely known for its evaporating establishments. We say satisfactory, and mean so in the sense of showing intelligence and thoroughly understanding the situation from a commercial point of view.

Richardson Brothers, of E. Williamson, Wayne county New York, cover the questions in a general letter as follows:

"Our county probably stands at the head in the production of evaporated raspberries and apples. The proportion of canning factories to evaporating establishments in our county is about one of the former to 500 of the latter.

"It is generally believed, taking one year with another, losses by fire considered (for most insurance companies refuse risks on evaporators),* that there is little or no profit in the business of evaporating apples, as the season is short and expenses of running extremely heavy; it requires no less than 80 or 90 hands to produce 500 bushels of evaporated apples per day.

"In this county the producer generally converts his green apples into evaporated stock.

Many of the evaporators who answered the preceding questions also touched upon those already given in previous papers, and in every case took similar positions to those already cited. The replies as a whole are as satisfactory to the position we have taken on the subject, as were those from the canners. They write us that with the possible exception of canning, evaporating pays the grower better prices for his products than any other method of disposing of them. The average estimate of the capacity of an evaporating plant of $5,000 value is 800 bushels in 24 hours. Several have tried the co-operative plan, and in all cases it has paid both them and the grower, the combination being extremely satisfactory in every sense.

It will be understood that these cases are not offered as evidence of the value or desirability of partnerships of this sort; for, while it so happens they have been satisfactory in the cases cited, it is by no means invariably so.

A modification of the partnership plan is frequently successfully carried out in districts where milk is a staple product, which might and probably would work well for the disposition of the produce of the farm and orchard. Creameries are built, run and managed by the owners of the stock producing the milk, the expenses and profits being of course divided pro rata in proportion to the amounts of both money invested and milk turned in at the factory. As a matter of course the prices paid at evaporating establishments vary with circumstances. The average prices range from 20 to 30 cents a bushel as they run, including cider apples. Naturally, unless the grower is extremely progressive the proportion of cider apples to those of the best quality is largely in favor of the former. Indeed, many managers of evaporating establishments complain that the first and second grades of apples are marketed through commission men and the inferior stock taken to the evaporators.

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*Here is a point worthy of the thoughtful consideration of those who contemplate engaging in evaporating fruits on a large scale. They must be prepared with an abundance of capital to take the risks of fire which, as insurance companies refuse to issue policies, must be great.—EDITOR AMERICAN GARDEN.

We come again to the question whether the deductions gathered from the experiences of the people interviewed on the subject are to be considered as beyond all question, and, too, whether these means of escape from the stagnation of prices in farm, garden and orchard products are the best to be had, or whether others equally as good exist or may be found. As stated in our last paper we will soon show the opinions of growers on this same subject, and by comparisons between their opinions and those of the canner and evaporator, both, we must consider, gleaned from experience, we may find the happy mean which shall place us on a safer, surer footing in the near future.

[TO BE CONTINUED.]

HARDY HERBACEOUS PERENNIALS.

THEIR ARRANGEMENT IN MIXED BORDERS.

It is almost impossible to suggest any plan in the arrangement of the flower garden that can be generally adopted, even on principle, much less in detail. So much depends upon the size, form and situation of the plot to be ornamented, together with its natural advantages, that it is not easy, if it is even possible, to put on paper instructions for planting a mixed border on a definite plan, as too many details are involved to admit of its being made intelligible. To a great extent the selection and arrangement of plants is a matter of individual taste. Our best gardens are filled with plants selected with the one object of the gratification of the owner's taste ; and there are as many tastes to please as there are gardens to plant. But there are some general principles to be understood ; their aplication will depend wholly upon circumstances. We will state these principles briefly, and leave to those interested the detail of management.

First and most important, the border should be so composed as to be more or less replete with interest at all points and at all times; if not with flowers, at least in foliage and in diversity of individual aspect. In order to bring about this result the planter must know the plants, their height, color, habit, their general appearance at all seasons, time of flowering, and the duration of the flowers. Skill and taste in grouping must do the rest.

Plants must be graceful to be truly beautiful. Strange forms may be curious and interesting, but real beauty consists of elegance, grace, symmetry, united with harmony of color. Perfect forms are the only graceful ones. An object to look graceful must look natural. It must not be tied out of shape; on the contrary, it should have sufficient room for its perfect development in its natural form, and there may be no impertinent interference of art in its growth. A trailing plant must not be made to climb, nor a climber to trail. Neither trim up a shrub to assume a tree form, nor cripple a tree by "cutting back" until it becomes a shrub.

No more plants should be selected than will be sufficient to fill the border without crowding, even after they have attained full stature. Harmony of color, harmony of form, and agreeable contrasts of both, are of the greatest importance. Without these harmonies there will be no pleasing effects. Although we would encourage an acquaintance with hardy herbaceous plants, yet we would not recommend their exclusive use in the mixed border, their appropriate place.

It might be possible in some localities to make a selection of hardy perennials alone, capable of keeping up a lively interest in the garden from March to December, and it would be difficult to keep up that interest without them. They are the essential ground work of a good garden. They are the only plants that give flowers in early spring and for many weeks in autumn, after the frost has killed the more tender forms.

Good annuals and bedding plants are invaluable materials in the arrangement of the planting for summer flowers, and their use cannot profitably be dispensed with. They should, however, be regarded as aids, not chiefs, and be allotted their position in the garden according to rank. Annuals are particularly useful to take the place of spring-flowering bulbs. When started in the hot-bed or in the house, they will be nearly ready to flower by the time the weather is warm enough to plant them out in the border, which is about the same time the hyacinths and tulips have lost their beauty, thus keeping up a succession of bloom the entire season. These bulbs by nature belong to the border, with other herbaceous plants, and should be interspersed with stronger and later flowering plants, as their bloom is perfected before other forms have made much growth; over these bulbs annuals may be planted as before suggested.

Spring-flowering plants, owing to their usually low stature, as a rule, are to be planted at the front of mixed borders; and in so far as concerns many of the fibrous-rooted evergreen and deciduous species, the practice should be the same. But with regard to the spring-flowering bulbs, there does not appear to be any reason why they should be crowded to the front of the border in the same way, notwithstanding that they are in most cases of a dwarf habit. Their foliage is in the way for only a short period, and may often be removed earlier than it is without injury to the plants. The advantages that would be obtained, therefore, by planting them in the spaces between the summer-flowering plants all over the border are obvious. The fringy and irregular appearance in spring that results from the practice of crowding flowers of that period to the front of the border would be done away with, and every part of the surface unoccupied with dormant plants might be as richly varied and beautiful then as at any other time.

To sum up in a few words: So arrange the hardy plants that there will be at all times a happy blending of form and color, so that there will be a continuous change of bloom without affecting the harmony of color. In this arrangement there will not be found large masses of color, but rather pleasant clumps of flowers, constantly changing form and position, yet ever in perfect harmony. The annuals and bedding plants used as aids will be so intermixed as to produce the same effect.

This arrangement will show the gardener's art to advantage. He must ever have an abundance of flowers, and will be compelled from time to time to change the position of his plants. Hardy forms require frequent changing; division is a frequent necessity. A rotation of crops is as important in the border as in the field. It matters not how much feed a plant has, a change of locality, even a few feet, is essential to its perfect development. In their native habitats, herbaceous plants are constantly on the move, slowly, to be sure, but steadily. Some forms will remain long in a given position, but few thrive as well as when occasionally they are given a new soil and a new home.

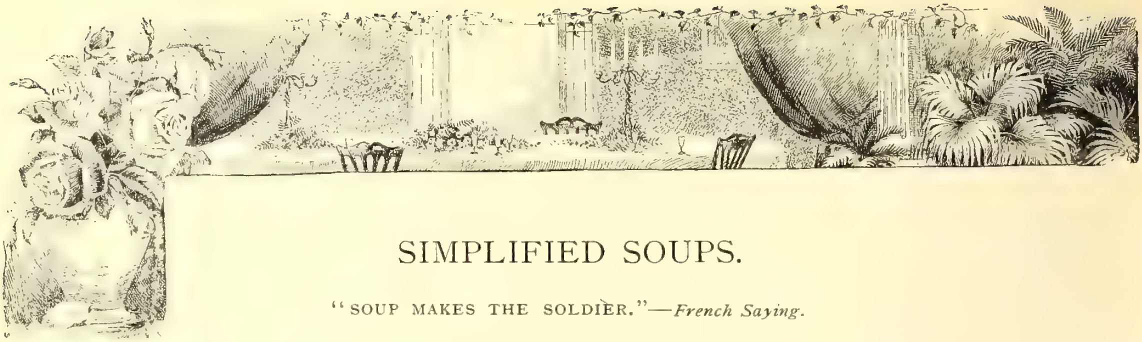
C. L. Allen.

A NEW CATTLEYA.

Among a lot of orchids received last June from the river Negro were a dozen large specimens of *Cattleya superba*. These were wired on long flat rafts of teak and suspended in partial shade under a lemon tree, but where they received the full force of the morning sun. All soon began to make roots and growth. Some soon bloomed and proved the finest form of *Cattleya superba splendens*, very dark in color and with immense round flowers. Among them was one plant which had evidently grown upon a horizontal branch and it was wired on a raft about a foot wide and three feet long. In October it showed three shoots, two with flower spikes, and the buds on swelling were of a very bright green instead of the usual dark color. I laughingly remarked to friends, "there will be a white *Cattleya superba*." But as that orchid is the one with which the people in Para are probably most familiar, and such a thing has never been imagined, the reply was, "impossible!" One Friday night the plant was in large bud, which still continued very green. On Saturday I did not chance to go into that part of the garden, but Sunday morning, rising in the first gray of dawn, I happened to go near the spot. Looking at me from the darkness I saw an immense white flower and found that I really had a white *Cattleya superba!* The plant is very large—about 25 well leaved pseudo-bulbs—and resembles the best form of *Cattleya superba splendens*.

The bulbs are long and green, but this color is not uncommon in the species, and plants with such bulbs generally develop flowers of a light pink color, of little value. The foliage is very large, thick and massive, almost round. The two spikes have each shown three flowers, which are large, round, with broad petals and sepals. The whole flower is white as driven snow, except that on the crest of the lip there is a small blotch of orange. The plant is of strong constitution.

Para, Brazil. Edward S. Rand, Jr.



SIMPLIFIED SOUPS.

"SOUP MAKES THE SOLDIER."—*French Saying.*

I hesitated to make soups for several years after beginning housekeeping because all the writers for young housekeepers made me think it was too formidable an undertaking, requiring extraordinary care and attention at every stage of the operation. French cooks are the best of soup makers and their first act is contrary to the usual instruction, which is to get a bone to start your soup. Now the marrow bone is all right if you have one on hand and want to save it, but it need not take the lead, except perhaps in the old-fashioned vegetable soup of New England, which is more properly named an "Irish stew." The French cook whose practice I have adopted starts his soup with solid meat. In the neighborhood of New York, where meat is high-priced, my butcher for 20 cents supplies two pounds of solid beef, free from fat, chopped in bits about an inch square.

Now we are ready to make our foundation. This meat I put on the fire in an agate kettle in 2 quarts of *cold* water. Let it come rapidly to a hard boil; skim; add ½ cup of *cold* water; let it boil again; skim a second time, and now it should be nearly clear. Set back where it will simmer, but on no account let it boil again. After simmering one hour add salt to suit the taste. Add half a carrot in fine slices and one small onion, sliced. Add parsley or other sweet herbs as desired, or that may be on hand. The East Indian currie powder, added in minute quantity, gives an indescribable flavor and may be used either with or without the vegetables. Simmer again for two hours, strain through a linen cloth, and when it becomes cold, skim if necessary. Thus is made the soup stock or foundation, with which we concoct all sorts of delicious combinations. It is usually stated that soup stock keeps well for a week; and so it will, on ice or in a *cold* place; but as a general rule I prefer to make only enough to last for two or three days.

Generally at the bottom of the stock when settled, there is a half-pint or so that is not clear. This I use for stews and gravies.

Many people make soup stock so thick that when cold it forms a jelly. I find it less trouble to make it as above described.

Though I make the most of my own resources, I find it a great convenience to have on hand a few cans of the ready prepared Huckins' soups, which come in quart cans and may be had at any first class grocer's. They are put up in great variety, will keep any length of time and are really a superior article. Some of our friends utilize them for soup stocks, but we use them in their original form, a quart can furnishing ample material for soup for two dinners for six people. Though always useful, we find these ready made soups especially convenient when unexpected calls are made upon our hospitality.

To return to our own soups, chicken and veal in combination, with or without the addition of a ham bone, is usually taken for making "white" soup stock, but we make the beef answer for all purposes. The soup stock is the foundation and body of most of our soups, the particular kinds being made by various additions as follows. The amounts are enough for six people. With any of these soups toasted bread served in squares is a proper accompaniment.

Cream of Rice.—Boil ½ cup of rice in a pint of stock till cooked. Press through a sieve and return to the fire with a pint of cream added. Let it come to a boil, being careful not to let it scorch. Serve immediately.

For Bouillon, simply heat the stock and add water if necessary. We vary the flavoring, at different times using currie, mace, clove, cinnamon and sweet herbs.

Amber Soup.—Take one spoonful of "brown thickening." Dissolve evenly in a quart of hot stock. Add a little grated carrot.

Pea Soup.—I have tried many ways, but my family prefer this. No stock is used. Take teacup Cleveland's split peas; put on cold water and boil till soft, previously adding salt and a saltspoonful of currie powder. Rub through a sieve, return to the stove, add one tablespoonful of "brown thickening" and boil five minutes.

Vegetable Variations.—To the clear soups may be added rice, barley, macaroni, cut celery, noodles, etc., to suit the taste or occasion.

Following are some recipes sent in by a valued friend. They are evidently for a family of 12 persons, and are somewhat complicated and more expensive than those above named.

Princess Soup.—Cut a chicken in pieces; wash it; butter a stew-pan and put the chicken into it with a blade of mace, an onion, a bay leaf and twelve white pepper corns. Let this simmer, closely covered, and to prevent browning shake the pan often. Then put in two quarts of hot stock (veal stock preferred) and simmer one hour. Put into another stew pan two ounces of flour and two ounces of butter; stir them together and cook until they begin to bubble, then strain the liquor from the chicken upon it, stir well and cook a few minutes. Take the white meat from the bones of the chicken, pound it in a mortar, add the stock, and rub all through a soup strainer. Just before serving add a pint of fresh cream and the juice of half a lemon. This soup must be made hot but not boiled after the chicken pulp and cream are added.

Artichoke Soup.—Melt two ounces of butter in a sauce-pan and fry in it half an onion, two young turnips, and a quart of Jerusalem artichokes peeled and sliced. Add gradually a quart of clear stock and simmer until the vegetables are tender. Add one pint more of stock, salt and pepper to taste, strain and press the vegetables through a sieve; return to the range to keep warm. Beat together the yelks of two eggs and a pint of milk; add to the soup and allow it to come to the boiling point, but do not boil.

Potage a la Royale.—Boil two ounces of macaroni until tender, but not broken; then throw it into cold water. Take three pints of white stock, put into it the macaroni cut into half-inch lengths and let it boil. Now remove from the fire and add the yelks of three eggs well beaten with a gill of cream and an ounce of grated Parmesan cheese. Return to the stove and allow it to come to the boiling point, stirring constantly.

Cream of Celery.—Boil one head of celery in a pint of water for three-quarters of an hour, then mash it well in the water. Boil a small piece of mace and a large slice of onion in a pint of milk. When boiling add a tablespoonful of flour dissolved in two tablespoonfuls of cold milk; boil ten minutes, add the celery, one tablespoonful butter, salt and pepper to taste, and strain. Return to the fire, add a cup of well beaten cream, heat and serve.

Potage a la Hollandaise.—For this you will require the following ingredients: One quart white stock, two ounces butter, one ounce flour, half a pint of cream, four yelks of eggs, one gill green peas, three small carrots, three cucumbers, one teaspoonful fresh tarragon chopped fine, one teaspoonful salt, and one teaspoonful of sugar. Trim the carrots and cucumbers into the shape of very small olives and cook them and the peas until just tender. Put the stock on to boil and add the salt and sugar. Break the eggs into a bowl, add the cream and beat until they are well mixed. Make the butter and flour into a paste with half a gill of cold stock, then pour on enough hot stock to dissolve it; when smoothly mixed stir it into the boiling stock, let it boil and then remove from the fire, and stir in a little at a time the beaten eggs and cream. Return it to the fire; let it heat well but not boil. Strain into a clean saucepan, add the vegetables, let all get hot together and then put in the tarragon.

MONEY IN THE GARDEN FOR BOY AND GIRL WORKERS.

ARRANGING SEED BEDS—PROPER SOILS—SOWING THE SEED—VARIETIES.

Third Paper.

DEPENDENCE upon one'sself is a strong essential of work in the garden. We may read volume upon volume of horticultural lore and our friends may load us down with advice, but the knowledge thus obtained would benefit little if we failed to personally put it to actual and practical use in the garden.

The complaint is often made by youthful workers in the garden, that the state of the *weather* spoils their work. "Oh! had it not been for the warm weather I would have had some beautiful balsams," exclaimed one of our young friends. Yet when we come to examine that bed of balsams we find indisputable proofs of neglect. The top soil is hard and baked, showing that it had not been loosened as it should have been, while the drooping stocks and faded blossoms show the want of water.

One important lesson that young gardeners must learn before they may hope for any great degree of success in their work, is that all *plants require* CARE, as do all things which have life. Nature will do her part, but we must not forget that we have largely taken the work of caring for garden plants out of the hands of Nature. While in their unimproved state they were provided for in all their needs, but when we take from Nature's forests her honeysuckle and woodbine, for example, and transplant them into cultivated soils, we must, so far as possible, supply the care they had in their natural state and element. Naturalists take from their native haunts the wild-cat and lynx, but do not let them lay and purr under a warm kitchen stove, nor feed them on milk or scraps from the table as they do the domesticated cat of our households. On the contrary, for the preservation of the animal its keepers supply so far as possible the food and treatment of its natural habitat. True, the progeny may in course of time be brought to the contentment of our domesticated animals, and thrive under similar care, as will plants under the influences of propagation and hydrization.

A good gardener will become familiar with any contemplated work before it is begun, so we will commence our task of seed sowing on paper before it is time to begin operations in the garden. Last month we told you how to make and prepare the hot-beds. We learned that the prime object of the hot-bed was to form a place where seed might be germinated and plants raised long before the weather would admit of the seed being put in the open ground. The proper soil is most important, especially in growing from seed. While most plants when large enough to transplant into the open ground will do well in ordinary garden soil, either moderately light or heavy, the soil in which the seed is sown, either in the greenhouse, hot-bed or window, should be light. Many beginners have bitterly complained of poor seed, when as a matter of fact they had so covered the seed with heavy soil that it was utterly impossible for the tender seed shoot to push through it and show its head above ground. After expending its vitality in a vain effort to come through the soil it "died back" and was lost. Of course it is fully understood that all seeds do not germinate, and that many times we are liable to obtain worthless seeds. With the best of soil and all the advantages which a greenhouse gives, we have had quantities of seed that failed to germinate. For use in planting seed, and especially under glass, we have found that a soil composed of sod, manure, loam and light sand thrown into a heap and turned over and over several times during the year was the best obtainable, but as every one cannot prepare such a soil they must do the best they can with that at command. Soggy or clayey soil should not be used for seed-growing under any circumstances. Produce soil as light as possible, and if it is inclined to be heavy, mix sufficient sand with it to obtain the desired lightness.

It will be found a good plan to secure as an adjunct to the hot-beds, the kitchen windows which we spoke of last month, for there are many plants we may raise from seed, in the window, before it is desirable to begin operation with the hot-beds.

Oftentimes small pots are used in which to start seeds, but we do not consider them so desirable as shallow boxes. Such boxes may be easily made by cutting soap-boxes in half; or, if but few seeds are to be raised, shallow cigar-boxes will answer the purpose nicely.

We must now consider whether we want to raise more largely of flowering plants than of vegetables, and this must be determined by the wants of the people who are to be our customers. If the people in the neighborhood are in the habit of buying plants in the spring for summer blooming, of course you want to supply the demand. The business talent of our young gardeners will show in these things, for all business is governed by the law of supply and demand. We can easily see that it would be folly to spend our time and money raising vegetable plants to the exclusion of all else, when the demand was almost entirely for flowering plants. Bearing this in mind we must go deeper into details and, so far as possible, supply the particular *kinds* for which there is the greatest demand. This is rather difficult to do at first, and indeed at any time, for the plant and tree purchasing public are capricious. Last year perhaps they may have bought in one section almost entirely of petunias, in another nearly all of verbenas. The coming season it is quite likely that they may want neither of these species, but demand phloxes and asters. The only way out of the difficulty is to grow and have for sale a good stock of the standard kinds, and, if you should secure a strain of some plant unusually nice, say *Phlox Drummondi*, in a locality where it is not generally known, you may by judicious talk induce each of your customers to try a few plants of that kind.

Returning to our shallow boxes for the window, they should be filled to within a half inch of the top with the soil prepared as directed, and this soil firmed down. In sowing the seed the depth of covering depends on the size of the seed. A good general rule is to cover the seed about its own depth. The beginner would perhaps do best if guided by the directions printed on the seed packets. After the seed is sown the soil in the box must be kept moist at all times; if allowed to get dry there is great danger of the seed being made worthless. Panes of glass laid over the box will assist in retaining moisture and in germination.

When the young plants have grown so that the first leaves are good and strong, the plant will then be an inch to two inches high, and should be transplanted in light soft soil to pots or to other shallow boxes, as preferred. These pots or boxes may be set in one of the hot-beds, where if given proper attention they will thrive nicely.

This *proper attention* consists mainly of the management of the hot-bed sash and water. Every hot-bed should be provided with some sort of covering which may be laid over the glass at night. Large gardeners have shutters made of wood, or mats braided out of straw. For the beginner pieces of old carpet will answer nicely. In the morning when the sun gets warm, say about ten o'clock, the sash of the bed should be raised a few inches to admit the air, which is one of the requisites to the successful growth of plants. The length of time which the sash should be allowed to remain raised and the height it is raised will depend upon the weather entirely. In March and early April, in the vicinity of New York, the sash should rarely be left up later than three o'clock. If the indications are that the night is to be a cold one the sash should be lowered early in the afternoon and the whole covered with the old carpet. Of course, as the weather gets warmer, the sash may be left up longer. The young plants should be faithfully attended and watered each day. The manner of seed-sowing and the soil in the hot-bed is the same as for the box in the window.

We have now reached the point of *selecting the seeds* and finding out when to sow them. I hope the young reader will follow closely what is said on this subject, for many mistakes are made purely from ignorance on this point. For example, many beginners have an idea that if seed is not sown at a given period it is useless to sow it at all. This is not so, for while it is necessary to sow seed early of some kinds of plants, if we would have the plants early, if sown a month later the result would be simply that the season of bloom would be correspondingly late. Of course judgment must be used, for seed of verbenas, for example, sown in July would be of little use that season. Then there are the mistakes made on the other side of the same question. The beginner will sow large quantities of seed in early March and none afterward. With some kinds this course would be all right, but when one desires a succession of flowers or of plants as we generally do, they must be raised at different intervals. This point the commercial gardener must thoroughly understand and work accordingly. For example, the latter part of February we would sow petunia seed in our seed boxes or hot-beds. These would bloom in pots or in the garden in May and June, early enough for your customers who want flowers early and who are willing to take the risks of early, or rather late frosts and cold rains. In March early, and again at the last of the month, and early in April, we would sow seeds for later blooming. The periods are about the same for sowing seed of snap-dragon, verbenas, asters, phlox and other plants; while with balsams, there is no necessity of sowing the seed under glass or in a warm indoor place at all, unless to sell them in pots, when they may be sown in the pots in April.

As we are supposed to be *in this business to make money*, we must aim to supply our customers with such plants as they may desire, so that I would advise the young gardener to obtain the catalogues of the seedsmen and florists, and read over the list of plants which may be grown from seed. Besides these I have already named, the following may all be grown from seed and are in more or less demand by lovers of flowers: Nasturtiums, alyssum, lantana, zinnia, pansy, feverfew, carnations, lobelia, larkspur, etc. We must be prepared to grow these plants in quantities, to supply the demand. If by any chance we should get a large supply on hand for which we have no sale, we have yet our own garden to look out for, and from which we expect to make money, as will be shown in our next paper, when we will also take up the raising of vegetable plants, and other operations.

The writer would be glad to answer any questions of interest to the young reader of this series of papers, either by mail or through the columns of THE AMERICAN GARDEN. I am more than willing to help any who are in earnest in this work, in any way in my power. Any communications addressed to me in care of the publishers of this magazine will reach me.

GEO. R. KNAPP.

(TO BE CONTINUED.)

FESTIVAL OF THE MONTHS.

This little celebration makes a very pleasant deviation from the time-worn fair, bazar or parlor sale that usually flourishes through the winter months. Twelve booths are necessary, but the number of attendants in each of course may be varied to suit the surroundings. At a recent very successful event of this kind at a large city church, from four to twelve ladies officiated at each booth.

January was represented by a profusion of cotton-batting snow, sprinkled with diamond dust, and the articles sold were skates, sleds, mufflers, mittens, gloves, etc.

February was of course devoted to St. Valentine, and the decorations were composed largely of valentines, which with candies, cake and birthday cards formed the sweet array displayed for sale.

Japanese kites bedecked the shrine of March, while these and various other toys composed the stock in trade.

April's bower was daintily trimmed with green and white, with tiny bouquets of moss, violets and ferns sprinkled about. A fine assortment of rubbers, gossamers and umbrellas was constantly on hand.

May had such a domestic and practical booth, that even the draperies were composed of kitchen aprons, and a bristling array of scrubbing brushes, brooms, whisks, dust-pans, soaps and mops filled the counter.

June, the month of roses, was a bower of vines and flowers, with choice cut blossoms and pretty growing plants for sale.

July was resplendent in the national colors, and quantities of ice cream was disposed of within her bunting bedecked walls.

August was devoted to the seashore, and the little attendants dressed in sailor suits did a thriving business in pails and shovels, Japanese fans, painted shells and shell jewelry.

September's booth bore a profusion of all the fruit and vegetables obtainable, and was decorated with various grains to represent harvest time.

In strong contrast to the fantastic ornamentation of the last named booth, October's was plainly arranged like a very neat store room with prettily papered shelves, and arranged upon them were jars of jellies, jams, preserves, pickles and sauces, while upon the little table in front were baskets of nuts and heaps of winter apples.

A quaint New England kitchen, with an old fashioned thanksgiving dinner spread upon the table and the attendants in Puritan costumes, made November a very popular month. Dinner was served here, and there was on sale home-made mince and pumpkin pies, baked beans, doughnuts and various other indigestible dainties.

December held the crowning glory in the shape of an immense Christmas tree, beautifully trimmed and laden with choice gifts, and the table that supported it was filled with books, toys, and anything suitable for Christmas remembrances.

NOTES.

A Novel Entertainment.—A very pretty entertainment was recently given by the Band of Hope connected with an English Sunday school. The principal feature of the programme was the rendering of a piece called "The Flower Queen and her Court." A large bower of flowers and evergreens occupied the platform, and in the back part of this was the Flower Queen's throne, with seats on either side for her court. The Queen is supposed to have sent her nymphs on their mission into the world to give comfort and sympathy to the poor and distressed. The Queen tells this in an address and at the words,

"But hark! I hear their welcome feet
Come tripping back again to me!"

a door was thrown open, and the Flower Queen's court, consisting of twelve young girls in white, covered with wreaths and garlands of flowers, entered. Each nymph in response to the command of the Queen told the story of her mission, and at the end of the last recital all knelt and repeated a prayer for all in distress. After this the Queen, followed by her court, passed out of the bower, through the centre of the room and out at the opposite door. Appropriate musical selections between each recitation added attractiveness to the entertainment.

Flower Worship in India.—A traveler thus describes flower worship as practiced by the Persians in Bombay: "A true Persian, in flowing robes of blue, and on his head a sheepskin hat—black, glossy, curly, the fleece of Kar-Kal—would saunter in, and stand and meditate over every flower he saw, and always as if in half vision. And when the vision was fulfilled, and the ideal flower he was seeking found, he would spread his mat and sit before it until the setting of the sun, and then fold up his mat again and go home. And the next night, and night after night, until that particular flower faded away, he would return to it, and bring his friends in ever increasing troops to it, and sit and play the guitar or lute before it, and they would all together pray there, and after prayer still sit before it sipping sherbet and talking the most hilarious and shocking scandal late into the moonlight, and so again every evening until the flower died. Sometimes, by way of a grand finale, the whole company would suddenly arise before the flower and serenade it together with an ode from Hafiz, and depart."

Winter Salads.—Cabbage, celery, etc., prepared by any of the following methods will be found an appetizing addition to the winter bill of fare:

Cabbage and Celery Salad.—Chop the vegetables very fine, using two parts of cabbage to one of celery. Pour over this a dressing composed of one cup vinegar, one teaspoonful salt and one tablespoonful sugar.

Cold-slaw with Cream Dressing.—Select a very firm head of cabbage and slice the desired amount as fine as possible. Mix one tablespoonful sugar and one teaspoonful salt in half a cup of vinegar. Stir into this half a cup of cream or rich milk, and beat well for five minutes. The dressing should be made just before the cold-slaw is put on the table.

Cabbage Salad Dressing.—Prepare the cabbage as for cold-slaw and sprinkle lightly with salt. Into two tablespoonfuls of butter braid one teaspoonful of flour; add to this a well beaten egg. Heat one cup of vinegar almost to boiling; put into it while heating one teaspoonful of celery seed and a sprinkle of black pepper. Add the egg, flour and butter, and let all boil for two minutes. Pour over the cabbage while hot; mix well, and when cold garnish with hard-boiled eggs.

A PAGE OF PERSONALS.

We regret to announce the death, in November last, of James Cassidy, professor of botany and horticulture in the Colorado Agricultural College, and formerly florist to the Michigan Agricultural College. He was a skillful gardener and an enthusiastic teacher. The vacancy in the Colorado College has been filled by C. S. Crandall, for some years foreman of the gardens at the Michigan Agricultural College, and a man worthy of the place.

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One of the newly established post-offices is Moreton Farm, N. Y., known the world over as the residence of Joseph Harris, the veteran seed-grower, writer and scientific farmer. In a recent note Mr. Harris writes that he has occupied Moreton Farm for nearly forty years.

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Charles Gibb, of Abbottsford, Quebec, is visiting India, China and Japan, and we may expect valuable notes on the fruits of those countries on his return. He thinks that he may find some iron-clad fruits of value in northern China and Mandchuria.

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Dr. T. H. Hoskins, our friend and valued correspondent, has lost the whole of his collection of seeds by fire. He had bred many novelties of particular merit for our northern borders, all of which are lost. He now appeals to his friends to send him any seeds which they can spare of his novelties they may happen to have grown. In the interests of a better horticulture, this request should bring many responses. Dr. Hoskins' address is Newport, Vermont.

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Charles Ellis Hitchings, of the firm of Hitchings & Co., this city, died of pneumonia on December 31. Although comparatively a young man, 36, Mr. Hitchings had gained considerable reputation in connection with the manufacture of boilers especially designed for florists' use.

PETER HENDERSON.

Peter Henderson, so widely known as a seedsman, gardener and florist, died at his home on Arlington Avenue, Jersey City, on Friday, January 17th, ultimo. Although he had been suffering from an attack of the prevailing influenza, his illness was not regarded as serious until it turned to pneumonia. On Thursday evening the symptoms became alarming, and within twelve hours from that time he died. He was born in 1823 in the Scotch village of Path Head, near Edinburgh. His father was the land steward of a gentleman in the neighborhood. His early education was obtained in the parish school, where he was successful in obtaining a number of prizes. He was always a close observer and had the faculty of turning his observations to good advantage. He early became interested in botany and the arts associated with it, and before he was eighteen years of age had twice obtained the medals offered by the Botanical Society of Edinburgh for the best herbarium. At sixteen he was apprenticed to a gardener, and before he came to this country at the age of twenty, he had already written for some of the English horticultural publications. In 1843, with little capital excepting pluck, industry and a strong constitution he came to this country, and entered the employ of Thorburn & Co., Astoria, Long Island. He also worked with the late Robert Buist and Charles Spang of Pittsburgh. By frugality he accumulated a small capital, and in 1847 he began business as a market gardener in Jersey City. He worked hard and was successful, and for upwards of twenty years this was his principal business. He began the cultivation of ornamental plants, and the business became so great that market gardening was gradually given up. A little later he became a seedsman, and this soon proved the most important part of his business; at the time of his death he was accounted the most successful and widely known seedsman in the country. In 1865 the firm of Henderson & Fleming began business as seedsmen in Nassau street, and afterward it was moved to the present location in Cortlandt, with the firm name so familiar to all gardeners. He was probably the most widely read on matters pertaining to his business of any writer of his time. His contributions were always welcome to any horticultural publication and his books among the best selling published. He always retained an affection for his countrymen and gardeners in general, assisting many of them in different ways. He was a busy man, but even those nearest him say they could hardly understand how he accomplished so much. He was indefatigable in his efforts to extend his business, his sagacity was rarely at fault, and his activity and observation were ceaseless. His kindly nature and uniform courtesy endeared him to those who met him, even casually, and have been the inspiration of many a young florist. Having a strong constitution by nature, he rarely suffered from ill health, a circumstance which he himself attributed to his practice of spending some hours in the open air each day, working about his grounds or superintending others. Although careful, he was liberal, and many benefited by his kindness. He leaves a widow, two sons and two daughters.

THEY SAY

This is an open department for the use of all interested observers, from whom correspondence is solicited on any topic of horticultural interest. Valuable items are frequently crowded out, but all will appear in due time.

Poverty May Apologize for a dirty dress or an unshaven face; men may be negligent of their person; but the sentence of the whole nation is that he who is a sloven in his garden is a sloven indeed. The inside of a laborer's house, his habits, his qualities as a workman, and almost his morality, may be judged of from the appearance of his garden. If that be neglected, he is, nine times out of ten, a sluggard or a drunkard, or both. —COBBETT, 1826.

Montlucon Sugar Pear.—European apples have rarely been found as good for America as seedlings raised on our continent, but with pears it is different, most of our popular ones being of foreign origin. Any new and good introduction to the old world is worthy trial here. The Belgian *Bulletin d'Aboriculture et de Horticulture* recently gives a colored plate of Le Poire sucree de Montlucon, which though discovered on the college grounds of Montlucon in 1812 by the gardener, Rochet, has not come into general cultivation. It is a very large russety brown and yellow pear, of excellent flavor, and very productive, and we should imagine from the description, well worthy of American trial.—THOMAS MEEHAN.

Trees for California.—The trees and plants of other countries suited to the peculiar climate of California have been introduced to a very limited extent. There are no doubt thousands of these that would prove of the greatest value to the state. All, or nearly all, of the flora of the higher Andes would undoubtedly flourish here, and many from other high dry mountainous regions. The species from which the indispensable quinine is made would probably flourish here if proper selections were made from the start. The great Mohave desert in the southeastern part of the state might be converted into a grand, most valuable forest by making proper selections of the best from other hot arid regions of the world. Robert Douglas, the forest king of Illinois, is confident that we have in our own flora most valuable trees that would flourish there like a green bay tree.—D. B. WIER, *Cal.*

Jersey Notes.—*Remedy for Cabbage Worm.*—A friend who kept Guinea hens last season and allowed them to run in his cabbage patch says they kept the plants entirely free from worms.

Lee's Favorite Potato.—We planted, the last spring, Puritan, New Queen and Pearl of Savoy, all of which were sent out as extra early varieties, and found Lee's Favorite earlier than any. We have before tried it with Beauty of Hebron, Early Rose and E. Vermont with a like result, and we shall plant it next year in preference to any other early potato we have ever tried.

Red Cedar as an Ornamental Tree.—The red cedar grows rather slowly and when quite young is inferior to many other evergreens, but when 25 or 30 years old it improves greatly, and from that on for an indefinite length of time it acquires new beauty, and after more rapid growing trees begin to fail from old age its rugged trunk and dense masses of dark green foliage give it a picturesque beauty which no other evergreen can claim.

Ruellia Macrantha.—When we first tried this plant it was very much inclined to throw up long-jointed shoots and at flowering time the leaves turned yellow and dropped, leaving bare stems with only a tuft of leaves at top. Last spring we decided to try a new plan of growing it. When it had done flowering, we cut back all the shoots to about four or five inches and allowed the plants to remain in the same pots in which they had flowered. The object of this treatment was to obtain a larger number of shoots and a slow growth, which would give short-jointed wood. We kept them pinched back and sufficiently crowded for pot room to continue this style of growth all summer, and when the weather required them to be removed to the greenhouse in autumn, we gave them pots two sizes larger and a very rich compost, and the result has been fully satisfactory. They are now (middle of December) full of buds and bloom, the foliage full and dark green, and the flowers are much deeper colored than they have previously been. If allowed plenty of room while growing through the summer they must have correspondingly large pots to flower in or they will become so filled with roots as to need watering largely and often, and if neglected at all will shed their leaves.—WM. F. BASSETT.

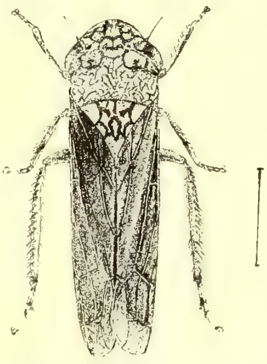
Lemons in Sicily.—Residents in our citrus regions will be interested in the following excerpt from *Fruit Trade Journal:* Lemons in Sicily are divided into two classes, the true lemon and the bastard lemon. The true lemon is produced by the April and May blooms; the bastard by the irregular blooms of February, March, June and July, which depend upon the rainfall or regular irrigation and the intensity of the heat during the summer and winter seasons. The true lemon requires nine months to reach maturity, from the bloom in May to the mature fruit in January. There are but three harvests of true lemon. The first is the November cut, when the lemon is green in appearance and not fully ripe. Lemons of this cut are most highly prized. They possess remarkable keeping qualities, and are admirably preserved in boxes in warehouses from November until March, and sometimes as late as May, and then shipped. The second cut occurs in December and January. Lemons of the January cut must be shipped three weeks after gathering. At this date the lemon has acquired a yellowish appearance. The third cut occurs in March and April. The fruit is shipped as soon as gathered, spring prices being always high. The uniformity in size of lemons, as we meet them in the trade, is due to their monthly harvestings from October to March. No sizer is used or even known here.

Bastard lemons present well characterized peculiarities in shape and appearance. The inner skin is fine and adheres tenaciously to the meat. They are hard, rich in acid and seedless. The bastard lemon produced from the bloom of June 1st is still green the following April, and ripens only toward the end of July. It remains on the tree over a year and sells well in summer. Besides the March and June bastards, there are yet others that remain on the tree from twelve to eighteen months. The true lemon can be left on the tree until the end of May or the first week in June, but it interferes with the new crops, drops off from over-maturity, and is liable to be attacked by insects. The bastards, on the contrary, withstand bad weather and parasites, and they mature from June to October. It is estimated that four times more oranges than lemons are lost in the groves and warehouses.

Coral-flower. — Following up the efforts of The American Garden to straighten out the confusion arising from the want of authority as to which common name should be selected for general adoption when a number of species are known by the same name, I have thought it would be as well occasionally to note such cases, and to suggest which one is the oldest and should be retained. "Coral-flower" has long been applied to *Erythrina Crista-galli.* More recently *Cuphea platycentra* has become coral-flower. In some sections in still more recent times *Russelia juncea* is coral-flower. Should a florist receive an order for coral-flower with no means of distinguishing which of the three his customer required, I suppose he would be justified in sending the erythrina. By the way, what a glorious ornament to the garden, as a tub-plant, the erythrina makes. I have seen old specimens ten feet high and as much broad, a perfect blaze of beauty in August and September. They transplant so easily that some set in the open ground every spring and keep in a cellar during winter.—Thomas Meehan.

Estimate of Potatoes in 1826.—Our present estimate of the value of potatoes was but little shared by Cobbett, a celebrated political writer of England, who was compelled, for political reasons, to take up a residence in this country, and who wrote a book at Hempstead, L. I., entitled the "American Gardener," who said, in writing of the crops in England, in 1826, of the potato; "I do not preceive that they have many *potatoes*, but what they have of this *base root* seem to look well enough. It was one of the greatest villains upon earth (Sir Walter Raleigh) who (they say) first brought this root in England. What a pity, since he was to be beheaded, the execution did not take place before he became such a mischievous devil!"

The Larger Grape-Leaf Hopper.—The interesting insect, represented somewhat enlarged in the engraving, frequently puzzles grape growers by its peculiar appearance and habits. It is a cylindrical jumping insect about half an inch long, slate-blue or gray above and reddish-yellow beneath. It is known to entomologists as *Oncometopia undata*. It lays its eggs in single rows in the wood of the canes, and is said not only to attack the leaves, but also to puncture with its beak the stems of bunches of grapes, causing them to fall to the ground. "Sometimes it pumps out the sap so vigorously from the succulent branches that the drops fall in quick succession from its body."—C. M. W.



Another International Exhibition.—The Imperial Royal Agricultureal Society of Vienna will hold, during the coming season, a "General Forestal and Agricultural Exhibition," in which all countries are invited to participate. It will take place in the rotunda and the adjoining park grounds of the Prater, May 15th to October 15th, perhaps to November 1st. The aim is to exhibit a complete picture of the present standing of all branches of agriculture and forestry. The programme issued by the management contains the following divisions intended for international participation:

"Machines and implements for agriculture and forestry; for horticulture, orcharding, vinticulture and hop-culture; for the breeding of poultry and bees and the keeping of silk-worms; for dogs and the art of hunting and fishing. Auxiliary means employed for farming, viz., artificial manures, food produced for the markets, animal products, etc. Models, plans, drawings and statistical dates."

Substitutes for Parsley.—It is well known that parsley is a slow-growing though a useful culinary garden herb and universally used. It can be kept green in the ground all through the winter by proper care, but few give it the attention required. I have known great anxiety to be exhibited in the spring in waiting for the parsley to become fit for use.

It does not seem to be generally known that Chervil (*Chærophyllum sativum*), which is another umbeliferous plant and belongs to the same natural family, may be used instead of parsley. It is a very quick-growing plant and should be more generally known. It should be sown in shallow drills as soon as the ground is fit to be worked in spring, and if planted at the same time with parsley it will be fit for use before the parsley is well over the ground. It is used for garnishing dishes, and also in soups and stews. It is so much like parsley in appearance that it would take an expert to distinguish one from the other.

Another quick-growing plant is pepper-grass, or garden cress (*Lepidium sativum*). This may also be used for garnishing and salads, and may be had in about two weeks from the seed by growing it on a slight hot-bed. To keep a succession of these substitutes through the season it would be necessary to sow two or three times, but the seeds are cheap and also ripen very freely in this climate.—T. Bennett, *N. J.*

Legend of the Chinese Lily (*Narcissus orientalis*).—There is a beautiful legend which accounts for the origin of this beautiful species, if any legend can: "Once upon a time a father left his property to two sons with the understanding that it should be equally divided, but the elder brother seized all the tillable land and left the younger brother nothing but an acre covered with rocks and water. The younger son, unable to obtain justice, sat down at the water's edge, bemoaning his misfortune. A benevolent fairy appeared, and giving him three narcissus bulbs told him to drop them in the water. Shortly after their flowers appeared, and neighbors crowded around to admire the fairy gift. In the course of a few years he accumulated a fortune by the rapid increase and sale of the bulbs. Then the older brother, envious of the younger's prosperity, bought great numbers of the bulbs—hoping to secure a monopoly by obtaining all of them—at so heavy an expense that he was obliged to mortgage his property to procure funds for the purchase. He planted all his land with the bulbs. They soon began to die, as they cannot live long out of water. He was ruined, while his brother, who had bought the mortgage, foreclosed it and became possessed of the whole estate in time to replant some of the dying bulbs in the watery acre."

A Great Opportunity. — The late Henry Shaw, a millionaire of St. Louis, left some three million dollars for the completion and maintenance of the gardens which he developed during many years. The gardens are to be known as the Missouri Botanic Gardens, and in them is to be afforded instruction in all matters of botany and horticulture. A novel feature is the organization of "garden scholarships," by means of which diligent and promising young gardeners are enabled to pursue scientific studies while serving an apprenticeship in gardening. Six of these scholarships are to be filled this spring. These gardens are already well known, and the director, Dr. Wm. Trelease, has won a reputation in several fields of botanical inquiry.

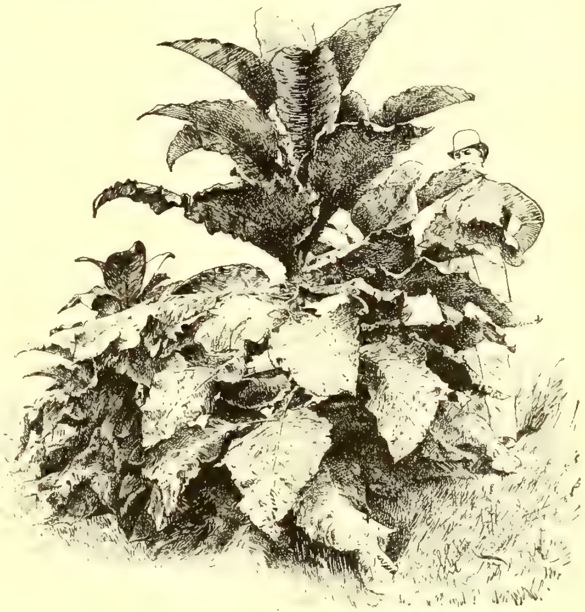
All conditions appear to be favorable at last for the maintenance upon American soil of one of the greatest botanical and horticulturul establishments upon the face of the earth. With the possible exception of Kew, no other institution of the kind can have such an income.

Kerosene as an Insecticide.—It was the second year of the Early Rose potato excitement, when we paid a dollar a pound for the seed. And it was the first appearance of the potato bug in Illinois. Determined to save the potatoes, we hand-picked the bugs for several weeks, but any one who saw the myriads of bugs that swarmed everywhere, can judge what that job meant. Driven to an extremity after trying experiment upon experiment to no purpose, kerosene oil suggested itself. How to use it was the question. Crude oil destroyed everything it touched. Studying over it one day, a cloud of dust suggested the way. I filled an old pail with road dust and then poured oil into it until the mixture was of the consistence of damp ashes—not wet, not moist, but still permeated thoroughly. The first application through a sifter started every bug. They flew off or disappeared. By continuing the applications, I harvested over a peck, of tubers from one small potato, and from that peck planted again that season, I had enough Early Rose to test on the table and plant all the ground I could spare in a small garden the next year. In one form or another I have used kerosene since. Fill a clam shell, or better, a tin spice box with oil, and place it in the center of the cucumber or squash vines, and the yellow striped bug will keep away. Try the dust I speak of above, only be careful of making it too moist on the leaves of plants. I know of nothing that can stand kerosene. Many housekeepers use it in washing clothes. A gentleman now living in Connecticut told me that when he lived in Pennsylvania where the crude oil could readily be obtained, that he used it most successfully in croup, giving it internally and applying it externally.—Salis.

Twenty Cents Worth of Window Plants.—Many people would like flowering plants in the house, but do not feel they can afford the expense of buying potted plants. Besides the cost of such plants, it often happens that a plant transferred from a damp, warm greenhouse to a dry and rather cold room seems to fail, and in a week or two presents such a poor appearance that the purchaser wishes it had never been bought. It may interest you to know what I did with twenty cents in the way of flowers in the window. In the fall of 1887 I bought for twenty cents a big root of *Astilbe Japonica*, and filling a soap-box with loam, I buried the root up to the crown in the soil, and left box and all in a cool corner of the cellar. Late in January, 1888, I found it had begun to grow, so I found an old flower-pot and managed to crowd the root into it with some of the soil from the soap-box. The pot was too small, but it was all I had, and after giving the root a good showering, I placed it in the parlor window on the 28th of January. Within a week the brown curly shoots had begun to open, and from that time on the plant grew magnificently, sending up a dense mass of its feathery green foliage. In time the delicate white flowers appeared, and made a beautiful display for nearly three weeks. In May the plant was placed in the garden, where it grew finely all summer. Of course there were no flowers, as the crop had bloomed in the house. As we moved the next fall, the plant was merely dug up and reset in the new garden. The next year it bloomed abundantly out of doors. In the fall of '89 I dug up the root, now grown quite large, and with a sharp hatchet chopped it into four pieces, leaving two pieces in the ground for next summer's bloom out of doors. The other pieces I stored in a box of loam in the cellar. While you read this the roots are again starting in new pots in my windows, and promise an abundant bloom. Here is a way, if you are patient, to have the beginning of a stock of window plants that are strong, vigorous, free from insects, and that will grow in the moderate heat of a living-room. If you wish to try it now, have a root dug up and potted. It will do no harm to chop it out of the frozen ground, provided care is taken not to tear or cut it too much. Place the frozen lump of root and soil in the cellar to thaw, and then pot it and place in a sunny window. One plant, costing you twenty cents, will give two plants in one season. Leave one in the ground; store the other in the cellar till after Christmas. The next year you will have four plants, the next year eight, the next year sixteen, and so on. You can keep succession in the cellar and fill your windows with a succession of flowers. Every plant will bear its crop and then go on growing in the garden, and by alternating the plants, giving them one year in the ground in turn, you will have flowers both in the house and in the garden from March to June. This is what I did and have done often. You can do it if you try! Why don't you try?—PARLOR GARDENER.

Exochorda from Soft Cuttings.—This fine shrub has been the stumbling block of most propagators, from the difficulty of propogating it except by seeds, and seeds have been produced in such meager quantities that the plant still remains a high priced one. Like many others, I have tried various methods to root soft cuttings, but without much success until last winter. In February last, Mr. Whittier, one of the propagators at Shady Hill, tried the following method with complete success. Cuttings about one inch long from forced plants were put into one inch of sand in small boxes which were closely covered with a single pane of glass, the cutting being set almost or quite down to the bottom of the box. These boxes were put in the warmest part of a house heated by flues, where the bottom heat was probably about 90° to 100°. They were syringed very carefully twice a day, and no other water given, with the result that all the cuttings rooted in two or three weeks. This result was seen by several who had tried and failed like ourselves, and excited much interest. The requisites for rooting Exochorda, then, seem to be these: Cuttings grown under glass; a high temperature; not too much water, and that all applied to the foliage; thin sand, and tightly closed small compartments. About 300 cuttings were used in this experiment, and everyone rooted; they are now 3 to 20 inches tall, in rows—F. L. TEMPLE, *Cambridge, Mass.*

Nicotiana Colossea.—The *Nicotiana colossea* must be placed in the first rank of the foliage plants exhibited at the Paris Exhibition in 1889. The history of this plant is curious enough. Several years ago I sold some fine plants of Brazilian orchids to a lady of St. Germain les Corbeil. Her gardener, Mr. Maron, a skillful cultivator, took the trouble to plant in his greenhouse the trimmings and dust of the orchids. A goodly number of plants sprang up, and among them was the *Nicotiana colossea.* This is not the only case in which a new plant has been introduced in the soil adhering to other plants. *Pteris tricolor* and *Begonia Rex* were discovered in the same way. Mr. Maron at once divined the proper mode of culture for the stout young seedlings, and transplanted them to the open air. Mr. André introduced the plant to the horticultural world in the *Revue Horticole,* Nov. 16, 1888, as follows: "The plant is annual when grown in the open air, perennial in the greenhouse. The stem is simple, very stout, cylindrical, herbaceous and fleshy, green in color, and attains a height of 6 to 10 feet in a single year. The leaves are of enormous size, 40 inches in length by 22 in breadth. When young they are purplish red and erect: afterwards they become spreading, and in color a dark glossy green. The leaf stalk is very stout, flattened, red above; the blade is entire, oval, pointed; narrowing at the base and forming two wings (or stipules) with wavy margins which run down the stem as far as the next leaf. The veins of the young leaves are dark red and very prominent on the under surface, which is ash-colored and pubescent, young shoots start from the axils of the leaves. A red spot marks the stem just below each leaf stalk." Unlike the cultivated species of tobacco, the *N. colossea* does not bloom in the open air. It did not seed until last year, 1889.—L. LEBŒUF, *France.*



Acclimation.—It does not seem to be generally understood that there is certainly something in acclimation, though just how far may be a question. It is often argued that the potato is just as susceptible to injury from white frost as it was 300 years ago; but then there has been no attempt at selecting hardier varieties. In nature, selection of this sort goes on, the weakest not surviving when hard times come. The Douglas spruce of Colorado is undoubtedly the same as the Douglas spruce of the Pacific. They are descendants of the same originals, yet the former will endure much more frost than the other. No one can explain just how this was brought about, but the fact of acclimation remains all the same. I have recently had a similar instance in relation to *Magnolia grandiflora*. Plants from Virginia seed are fairly hardy in Philadelphia, while those from further south never live.—Thomas Meehan.

Get "Novelty" Seed Potatoes Ready Now.—Some of the seedsmen announce new varieties of potatoes for the coming year, and offer prizes for the largest yield from one pound of seed potatoes. Those who may wish to experiment in this direction will find it a good plan to procure the seed tubers now, and to cut them up into small pieces with a single eye in each. Get a shallow box, like a raisin box, fill it with good soil, and bed the cut potatoes in the soil, packing them pretty close together. Give the soil a good showering and place in a warm, sunny window. They will then sprout and send up green stalks. When from two to three inches high, carefully dig them up, pot each little plant in a small pot, and keep in a warm, shady place for 48 hours, and then place in a sunny window. The plants will grow rapidly, and in about a month the tops can be cut off and used as cuttings. Set them in a pot of sand in a warm north window, and they will soon root and make new plants that may be potted and placed in a sunny window. When planting time comes, the young potato plants can be turned out of the pots and set in the ground. This plan has been tried by people who have neither frames or hot-beds, and has been found to work well. The young plants will be six inches high when other people are just setting the tubers in the ground. The number of plants will be much larger than if the seed tubers were merely cut up and planted. The larger the number of plants, the larger the crop. In other words, multiply your plants before the growing season begins.—C. B.

Flavor in Sweet Corn.—In addition to what D. W. says (page 227), in relation to flavor in "sweet" corn, let us add that climate and soil so affect it, that in some sections it is far sweeter than in others. As an example, take an ear of the best Evergreen; plant a portion on the south side of Long Island, in light sandy soil; another portion in New England; a third on the western prairies, and we will have three distinct varieties, so far as flavor goes. The writer's first experience with sweet corn was on the eastern shore of Cayuga lake, where the conditions are favorable for richness and sweetness. On coming to the city to live and depend upon the grocer for vegetables, our appetite for something from the garden was keen. When the season for corn came we were disgusted with the quality offered. Our friends said it was because it had been too long from the stalks, which could not be helped because of the distance between grower and consumer.

A few years later we moved to a farm fifteen miles out on Long Island. There we expected corn equal to that we had in our Cayuga home. When the corn came it did not bring with it that rich sweetness we had expected. Here was a surprise, mingled with regret. For lack of a better reason we charged it to the cooking. This charge was met with a hint that the fault was with my appetite. But not so, because I found that the same corn grown a mile to the north of us was much richer; and that corn grown on the borders of the Hudson river had the old time richness. Later, when on a visit to the corn growing districts of Connecticut, I found there the corn vastly superior in quality to any that I had ever tasted, and that the western sweet corn could not be eaten with a relish by any one who had eaten it in New England. Hence our conclusion that the sweetness comes from some natural condition of growth from elements that cannot be furnished artificially, and the quality of the corn is proportionate to the existing elements.—C. L. A.

Hot-Air Furnaces in Greenhouses.—A subscriber makes the suggestion that in the matter of heating greenhouses the common hot-air furnace may yet prove available. The objections against the hot-air furnace are two-fold. The hot-air pipes leak, and gas escapes into the pipes and mingles with the warm air that is discharged into the room, this gas being fatal to plant life. The second objection is the difficulty of making the air travel through a long narrow building like a greenhouse. A third objection is found in the "burning," so-called, of the air by coming in contact with the hot radiating surfaces. The air from the register is always dry, but "burned," or "devitalized," it could not be. The dust in the air may be burned and the ashes may mingle with the warm air and it doubtless does, but it is certainly less harmful than the dust, which may often contain the germs of disease. Our correspondent suggests the use of fire-clay furnaces and reports the use of such furnaces in dwelling houses. The idea is no doubt founded on the familiar porcelain stoves to be seen in Germany and Holland. Such stoves give out a soft, mild heat that is said to be free from the defects of our iron hot-air furnaces. If a hot-air furnace could be made of fire-clay or similar materials, and if it could be made absolutely gas-proof, it would answer for a greenhouse and would have the advantage, in a small house, of making it easy to ventilate, because the furnace would be continually discharging warm, fresh air into the building and forcing the bad air out.

Blossoms are the Joy of Trees, in bearing which they assume a new aspect, vying with each other in the luxuriance and variety of their colors.—Pliny.

NOTES AND COMMENTS.

Pinus Lambertiana, etc., page 9.—Although in the California Sierras this noble tree attains a height of between 200 and 300 feet, and a diameter of trunk of 10 to 20 feet, here in the the east it betrays no sign of the vast proportions it assumes in its western mountain home. We have some nice young trees of it, and they are healthy and look well, but they display no inclination whatever to quick growth, in fact, rather the contrary. Evidently they are unhappy here.

Pinus flexilis we have got and it gets along nicely, but has more of an inclination to spread horizontally than rise perpendicularly. But probably your correspondent refers to the true *P. albicaulis* (*P. flexilis* var. *albicaulis*, Bot. Cal. II. 124), which we have not got.

Pinus monophylla is probably the "Fremont's Nut Pine" referred to. We have it, but it is unhappy, that is, it makes very little growth. And as I saw it in the gardens of G. W. Childs, at Bryn Mawr, Philadelphia, it is no better. On the other hand, Andrew S. Fuller, of Ridgewood, N. J., tells me it grows quite vigorously in his grounds.

A New Japanese Fruit, page 40.—I am unacquainted with the *Myrica* referred to, but let me call your attention to another "new" Japanese fruit; namely, *Elæagnus longipes*. True, it isn't new by any means; at the same time it is almost unknown in general cultivation. It is a thrifty shrub, of comely form and appearance, and in midsummer bears the utmost profusion of red berry-like fruit, and two-year old plants fruit freely. The fruit is cooked and used as a sauce with meat, especially chicken, and it is one of the most delicious sauces that ever tickled the human palate. We are planting this shrub in quantity for its fruit, as we are currant bushes.

A prominent florist was here last summer when it was in full fruit, and was so favorably impressed with it that he at once saw a bonanza in it as a "novelty." "Where can I get stock of it?" he asked. "How many plants would you need?" I enquired. "Thirty thousand," he replied! "Not on the face of this earth," I answered.

When I was at Ellwanger & Barry's last August I wished to get some more plants of it, for I noticed they offered it in their catalogue under the name of *E. edulis*, but I found they had only one plant on their place, and that was their stock plant. But after a while I found a quantity of it in Vermont. Since then I find it at Cambridge, Germantown and elsewhere. It is not costly, and it is well worth growing either as an ornamental or fruit-bearing shrub, and it is perfectly hardy.

Sphæralcea Emoryi, page 16.—I grew and flowered this plant a dozen years ago. It is a herbaceous perennial, indigenous to the eastern slopes of the Sierra Nevada, perfectly hardy here, and a good grower and profuse and continuous bloomer, and it takes kindly to cultivation in our gardens. Like the perennial gypsophilas, fraxinella and *Euphorbia corollata*, when once established it lives forever. It bore seeds with me in limited quantity, but these grew readily. Its flowers are dull scarlet, but not showy or large. Altogether it is a brighter and better plant than the now very common *Malvastrum Munroanum*, its near relative.

Your note on "Good old Cosmos," page 16, reminds me that in this plant we have one of the most desirable garden plants for fall use that we grow. But there is something very curious about its time of blooming. I find that it matters very little whether I sow the seed in March or July, or whether the plants are large or small; they all begin to bloom about the end of September. I get a nice crop of flowers from them in June, by sowing in March or April, growing on the seedlings in pots and planting them out in May. The buds they "set" when in the pots are advanced into blossoms, but then there is a halt, and rank growth sets in, and we get no more flowers till the cool nights of fall come upon us, when we reap a gorgeous crop. By confining the plants in pots we can have blossoms at most any time. It is only fitted for outdoor cultivation in mild localities where early fall frosts do not occur, but as an indoor plant it is lovely.

Wm. Falconer.

Queens Co., N. Y.

FLORAL NOTES.

A Pretty Climber.—Lovers of rapid, graceful and fragrant climbers should not be without *Pilogyne suavis*. I find it one of the most satisfactory plants for summer and winter. A lady in Bristol, R. I., placed a small slip at the base of a monument last spring, and it covered the base and sides entirely in a short time, forming a living wreath. It was admired by everyone who saw it, and now pilogyne is a Bristol favorite. The slips grow easily in water or earth, and anyone can succeed with it.—*Salis.*

Flowering of Seaforthia elegans.—In the grounds of Eugene S. Shefield at Santa Barbara stands a handsome seaforthia. At 8 inches from the ground the circumference was 33 inches, and at the flower spike, 3½ feet from the ground, the girth is 23½ inches. It has twelve fine healthy leaves, every new leaf larger than the preceding. It is in robust health, as shown by the deep green color. It has come into flower at a bad time, this being the rainy season, with short days and long cool nights. Whether it will set seed I cannot say, as it was not forward enough when I saw it. Being the first, the flower spike is small, but as it will continue flowering now, the spikes will get larger as the plant increases in size. From the ground to the top of the leaves the plant is about 15 feet high, and Mr. Shefield may well be proud of his *Seaforthia elegans*, or as some will have it, *Ptychosperma Cunninghamii*. Is not this the first seaforthia to flower in any of the southern or western states in the open air?—A. Meston, *California, Dec. 11, 1889.*

FRUIT NOTES.

Nut Culture is constantly enlarging. In many parts of the country it is profitable, and it is always interesting. Every fruit-grower should include a few nuts in his spring plantings. Good things to try, in various parts of the country, are walnuts, chestnuts, pecans, filberts and hickory nuts.

Those who get Good Crops in the face of difficulties are almost sure to make money, because the majority of people fail. "The average farmer or fruit-grower," writes J. F. C. Hyde, "became discouraged by the curculio and black-knot, and no longer attempted to grow plums, while the few who were able to do so obtained large prices for their fruit."

Identical.—The First Season Strawberry is Gandy (Gandy's Prize). Essentially the same cut answers for both varieties. But such impositions are common.

Protecting Blackberries.—Where you can't grow peaches, winter protection is necessary, even with the hardy varieties. They may pass a winter unharmed at 20° below zero, but when you freeze a plant sixty nights and thaw it sixty days in February and March, it weakens and fails to do its best. Five minutes will cover a bush that will bear a peck, and when thus protected it is the surest of all the small fruits. It blooms after frost in spring, and usually all fruit is ripe before fall frosts injure, and with good cultivation or a generous mulch in June it will withstand any drouth. These plants, after one season's growth, should all be laid up or down the row, and laid the same way every year. Use a spading or manure fork; take out earth enough each side the plant so that it will bend in the root; put your foot at the base, the fork on the top, and bear it to the ground; place on it earth enough to hold it down; lay the next plant on this one, and so proceed till the row is down; then go over it and cover the main cane with earth. It is not usually necessary to cover all the branches; earth is the safest, handiest and best covering. If they were bent down and weighted, and no mice in the field, a little marsh hay would be sufficient, but when you can insure a quart to the minute for the labor bestowed in covering, what is the use in making any further objection? As soon as you plant your early potatoes, take a fork and lift the blackberry bushes up, work out the dirt from under them, press the soil firmly about the root so they will stand erect; they will not start enough to be injured by frost. I have left them so long that they had budded to grow under cover, and when taken out were injured by a frost following; if taken out earlier they would have been tempered to the frosts.—GEORGE J. KELLOG.

In Sicily lemon culture is 30 per cent. more profitable than orange culture; lemon trees are more prolific than orange trees. Prices for lemons are higher than for oranges.

Black-knot.—Robert Manning finds the *Prunus myrobálana*, some of the varieties of which have lately been recommended for planting as ornamental trees, exceedingly subject to the black-knot, and he advises caution in planting them.

The Le Conte Pear.—Parker Earle writes that in the south this year "the Le Conte pear bore heavily wherever planted, and it shows some market value, but its quality runs exceedingly low."

Protection from Mice, Borers and Birds.—I frequently "cut across lots" in going to the "corners," and thus pass through a neighbor's young orchard, where he has put wire netting around the base of his trees to keep the mice away, and it occurs to me that this would be a good way to keep the borers away also. Would it not be practicable to grow small fruits, grapes, and even cherries under wire netting to protect them from birds? Strong posts might be set up and light rails laid across their tops, and the netting spread on the rails, also around the sides of the plot. Such posts should be high enough to allow a horse to walk freely under the netting, say eight feet high. The cost would not be very much to enclose even a half-acre, and if the wire was galvanized it would last a lifetime. The meshes might be one inch square. Portions of the netting around the sides might be arranged to allow of its being rolled up or down to allow insect-eating birds to enter during the forepart of the season; but when fruit began to ripen it would have to be closed. Would it pay? I think it would. At any rate, the fruit-grower would have the satisfaction of picking and eating fruit that had not been mutilated by the birds, and he could allow it to remain on the plants until it was fully ripe.—J. T. MACOMBER, *Vermont*.

The Olive in the West.—There are millions of acres of foot-hill lands and rocky mountain sides in California exactly suited in soil and climate to the culture of the olive, and of very little value for any other purpose than scanty pasture. The olive is an evergreen fast-growing fruit, with slender lanceolate leaves like some of the willows, light green on the upper and nearly white on the lower surface. The tree is quite hardy, much more so than the orange. It grows readily from cuttings, and its culture is quite simple. Not injured, we believe, by any insects, except the scale (bark lice); these are often very troublesome. The olive is claimed by many to be the most profitable of all California's wonderful fruits.—D. B. WIER, *California*.

Novel Training of Grapes.—A grape-grower in Bristol county, Massachusetts, has adopted a plan which, though it may not be new, is certainly interesting. He sets stout posts at suitable intervals, with smaller ones between wherever there is a vine, and upon these stretches two strong wires at a proper distance apart, the lower one being placed far enough from the ground to allow a horse and cultivator to pass freely underneath. By the use of high step-ladders the fruit can be readily harvested and the vines trimmed or handled at will. The advantages claimed are: Ease in cultivation, and extra quantity and quality of fruit. The sun has a more direct effect by this method, and this is, of course, an obvious advantage. In many home gardens the old-fashioned trellis is being largely superseded by stake culture, with a decided gain in convenience.

Sand for Insects.—A California man has invented a machine for throwing sand blasts, either hot or cold, against orange trees to destroy the scale.

The dwarf Juneberry has come to stay. "Success" is probably the best variety. If the fruits are dried they make delicious pies and sauce.

Pruning of Grapes and Small Fruits should be done before the busy days of spring come. Study methods thoroughly, then adopt the best one suited to your conditions.

Probably the Best Blackberries for general purposes in the colder parts of the north are Snyder for early, Ancient Briton for mid-season, and Stone's Hardy for late.

We are rapidly coming to a time when we shall have no greater fear of the codlin moth and the curculio than we have of the potato-bug. We will spray our trees as regularly as we prune them.

Laws for the Protection of Vineyards.—A decree has lately been issued in Switzerland, making the treatment of vines for mildew obligatory. The enforcement of the law is in the hands of the Department of Agriculture, from which source also instructions proceed. Upon the failure of the grower to comply with this law, the authorities are to conduct a spraying at the grower's expense; the failure furthermore subjects the grower to a fine of from $2 to $18.—F. D. CHESTER.

Mulching Strawberries with Coal-ashes. Three years ago, says Professor Goff, at Dr. Sturtevant's suggestion, a bed of Sharpless strawberries was planted out and heavily mulched with coal ashes. The object was to see if this material would not act beneficially in keeping down weeds. It has done this in a marked degree, but this is not all. The yield from the plants has been more abundant than from another bed of the same variety that has received excellent culture of the ordinary kind. The plants have been almost entirely free from blight, though the Sharpless blights badly here when grown in the ordinary way. I should have stated that the bed has received no culture since the mulching except to remove the weeds that were strong enough to grow through the three inches of coal ashes.

The Crandall Currant.—(AM. GARDEN, Sept., page 309.) Frank Ford & Sons, introducers of the Crandall Currant, send fine photographs of the variety in full bearing, together with notes, from which we make extracts. The photographs are made from plants three and four years old, and the amount of fruit which the canes held is remarkably large. "In handling such a bush, and taking it a mile to the photographer's, of course some of the fruit fell off, yet it holds pretty well to the stem when dead ripe even." "A great many single berries taken in these photographs were five-eighths inch in diameter and a few nearly six-eighths inch, and very few were less than three-eighths inch." "With us the berries hang on the bushes longer than most small fruits after they are ripe, so that, for making jelly this season, we picked them nearly clean."

Grape vines should be pruned before spring opens.

Varieties of Plums for Massachusetts are discussed as follows by J. F. C. Hyde:

There are many good varieties of this fruit, but for market we should advise the planting of very few sorts. We have found that a large blue plum sells better than a green or even a red one. The public will not buy a delicious Green Gage so quickly as they will the large, showy Bradshaw.

For market purposes, we should name the Bradshaw, which is a large early purple variety, of fair quality, that always sells well, because it is large and handsome, and also because it may be put into our market before the same is supplied from New York and elsewhere. The tree is a thrifty, upright grower and is comparatively free from the black knot.

Smith's Orleans is of good size and showy, covered with a deep purple bloom, and sells well, though only of fair quality.

The Lombard is a well-known fill-basket variety of medium size and fair quality. It is reddish purple in color, and the tree is an enormous bearer. This variety needs to be thinned to secure fruit of good size.

We are inclined to stop here for market sorts, but if a yellow plum were to be added, it would be Prince's Imperial Gage.

For home use we should make a different selection—Green Gage, Washington, Jefferson, Yellow Gage, Reine Claude de Bavay, Lawrence's Favorite, McLaughlin and possibly a few others.

Black-rot and Mildew of grapes can be kept in check by the Bordeaux mixture. Get the materials ready during the winter, buy a spraying pump, and be ready to make an application as soon as the buds swell. A good formula for Bordeaux mixture is as follows: Slake 4 pounds of quick-lime in a little water, and when nearly cool stir it into 22 gallons of water in which 6 pounds of copper sulphate has been dissolved.

An Apple Story.—The Middletown (N. Y.) *Press* launches forth the following item for the benefit of studious horticulturists: "An apple tree on the premises owned by John Bransfield has attracted considerable attention during the past few days. The fact that it has come in for more than its ordinary share of attention is from the fact that there is a single blossom on the tree. On one side is the blossom as fresh as the first breath of spring and on the other ripe fruit. A further peculiarity of this tree is the fact that since it was large enough to bear fruit it has blossomed regularly three times a year."

Nomenclature in England.—It is interesting to note that our brother horticulturists of England are taking up the question of suit able names for varieties. Just now the discussion is almost wholly confined to conifers, but it is to be hoped that it will broaden out and accomplish the reform so much needed. The total disregard for suitable names has been the direct cause of the introduction of many old varieties of vegetables, fruit and flowers in to this country under new and fanciful names.

VEGETABLE NOTES.

Some Sorts of Gardening appear to be rapidly passing from intense culture into extensive culture. Many crops which we ordinarily call garden crops are now more properly field crops or farm crops. Cabbages, tomatoes, peas, string beans and melons are examples. The advent of canning establishments has been largely instrumental in bringing about these results.

White Egg-Plant.—A Louisiana subscriber is puzzled bcause he "planted seed of a long purple egg-plant, and one plant produced white fruit. It is fine, and of a beautiful yellow color when cooked." The peculiar plant was due to nothing more, probably, than a mixture in the seed. There are several white egg-plants catalogued, but they are commonly supposed to be inferior to the purple sorts for table use. We made a careful test of some of the white varieties last season, however, and found them fully as good as the colored kinds.

Best Sweet Corn.—On page 227, 1889, the query is put, "In sweet corn, is it impossible to combine a high degree of delicacy and sweetness with great earliness?" I have solved the matter by planting Farquhar's First Crop Sugar for three seasons. It is all the originator claims for it in earliness and sweetness.—Salis.

Radishes and Bread and Butter are a tempting combination to many persons who have great trouble in growing crisp, smooth radishes. On old garden soil it is almost impossible to grow them free from woodiness and worms. Your correspondent has found copperas to be almost, if not quite, a specific. Before planting sow the space with copperas, and no worms will attack the radishes. It must also possess some fertilizing property, judging by the results. Sow in the drills, with the seed, superphosphate for forcing a rapid growth. A radish must grow quickly to be tender. It may be in order to add that many persons will find the unpleasant effects of eating radishes entirely removed by eating the tender inner leaves with the root.—S. B. D.

Currie's Rust-Proof Golden Wax Bean—what a name!—is being introduced by Currie Brothers, of Milwaukee. It is not new, however, being "a variety of ten years standing, a sport from Golden Wax. The dry bean is a deep purple color." It is strongly recommended as an enormous bearer and as wholly rust-proof.

Earliest Tomato and Pea.—Aside from any purely business motives, can any subscriber tell us which of the many and deservedly popular varieties of tomatoes is without a doubt the earliest in higher latitudes? Among tomatoes and peas it is bewildering to choose where each catalogue claims "first early," and ground room forbids oftentimes a trial of the rival claimants. One week with us makes a difference of a half in profit, one way or other, in either of the above vegetables.—S. B. D.

Hand-Picking Potato Beetles.—T. B. Terry does does not believe in poisons for the potato bugs, and says: "Take it all in all we have thought it cheaper and better to pick the beetles as soon as the potatoes begin to come up, and keep right at it for two or three weeks to prevent them from laying many eggs. After that not much work is required."

Tomato Mildew is apt to be very destructive under glass. It is known by the yellowing of vigorous leaves in patches and spots. Finally the leaf dies and the plant suffers. It can usually be prevented by keeping the plants in a very vigorous condition, avoiding all draughts, and preventing the temperature from going too low at night. Has anyone observed mildew to be more prevalent when the plants are grown in beds than when grown in pots or boxes?

The Most Profitable Crops are those which are most difficult to grow.

Pototo Synonyms.—D. B. Harrington, the potato specialist, now of Delavan, Wisconsin, gives us the following synonyms in varieties of potatoes: "I have brought Early Rose under the following distinct names—Early Rose, Antwerp, Boston Market, Baker's Imperial, Chicago Market, Cayuga, Carter's Early, Clark's No. 1, Early Vermont, Early New Zealand, Early Maine, Early Dustin, Early Mohawk, Early Sunrise, Early Essex, Howard, N. Y. Market, Pearl of Savoy, Roxanna, Sunlit Star, Summit, Spaulding, Vanguard, Waverly and Watson's Seedling.

"I have paid extortionate prices for Peerless and Mammoth Pearl by the names of Baraboo White, Biscuit, Binnis Seedling, Beauty of Beauties, Conqueror, Dunmore Seedling, Davenport, Eximius, Galva, Gypsey, Gilbert's Seedling, Gould's White, Iroquois, Invincible, Jones' No. 8, Jumbo, Vermont Champion, West's Montana Beauty, Jewel, Luxury, Marvel of Beauty, Manson's Seedling, Patagonian, Rose's 74.

"An expert cannot find any difference in Snowflake, Big Benefit, Boston Cracker, Crawford's Seedling, Centennial, Chas. Downing, Mayflower, Early English, Pride of America, E. Burlingame and Potentate.

"Burbank Seedling, White Lion, Rochester Seedling, White Star and Johnson's Seedling are all the same.

"Early Beauty of Hebron has spread itself into Champlain, Early Date, James Vick, Jones' Prize-Taker, Washington, Vick's Prize, and a dozen other names.

"Hemlock, White Elephant and Late Beauty of Hebron are all the same.

"Blue Victor is known by the names of Valley Chief, Manhattan, Mitchell's Seedling, Knott's Victor, Blue Ruby and some 8 or 10 other names.

"Donganeil's Beauty, Mormon and Olympia are nothing but old Red Mercer.

"Early Ohio, Early Illinois, Prize, Royal Gem, Early New York and Extra Early Ohio are all simply Early Ohio.

"Continental, Cuban King, Judson's Favorite, Red Peerless and Stray Beauty are Bliss' Seedling.

"Colorado No. 1, Corless' Matchless, Everett's Eldorado, Late Vermont, Perfection, Red Ulink, Junkis, Seneca, Red Jacket, Wells' Seedling, Western Beauty and Winslow are names that are following Late Rose."

It is possible that some of these cases of duplication came from purchases which were not true to name.

Air-slaked Lime for the cabbage maggot is often recommended. As an experiment at the New Jersey station, a quantity of air-slaked lime was mixed with the soil of two rows of a small plot of early cabbage at the time of setting the plants. As the season for the attack arrived it appeared that the plants of the plot were all suffering, and an examination made June 18 showed that 12 plants treated with the lime had 66 maggots, while 11 plants not treated had but 24 maggots, proving conclusively the entire ineffectiveness and uselessness of the application.

The Common Hoarhound in California assumes the form of a strong, perennial, nearly an evergreen shrub. Bee farmers consider it a nuisance, for where it is very common it at times flavors the honey with its peculiar bitterness, rendering it unsalable. But this same bitter honey has been found to be a most excellent cough syrup, besides being very wholesome, and there is likely to spring up a great demand for it, while the flavor is preferred by some to all other honeys. When we know what the bitter is, we are not afraid of it, and soon learn to like it.—D. B. WIER.

SPROUTS AND SCIONS.

Isn't it about time for horticultural writers to stop writing about the ease with which 300 or 400 bushels of strawberries can be grown on an acre?

And how about the eternal caution not to plant early varieties of apples for market? Hasn't this been greatly overworked?

But when it comes to such matters as thorough tillage, liberal application of manure, concentration of effort well within the limit of capital employed, eternal vigilance, intelligent packing, honest dealing, promptness, and the like—can we ever say too much in behalf of all of them?

Doubtless a good many people have had occasion to regret having too many early apples, because they had too many kinds of them, did not grow or handle them well, or were not handy to a good market. But under the right conditions there is quite as much money in fine early apples as in winter kinds.

And as to strawberries, while there are few men living who ever grew 300 bushels of strawberries on one acre in one season, and while it is as difficult to do it as to grow 100 bushels of corn or 1,000 bushels of potatoes on the same area, yet it is a possible achievement, and the *rate* is not unfrequently reached on small areas.

What I object to, is holding out the idea that it is easy to do such things, even for beginners. It is so far from being easy that multitudes of good, experienced fruit growers have never approached very near to such a crop, and most of them would say it was only theoretically possible.

All experienced men know that there is a vast amount of exaggeration and misstatement in regard to the care and profit of fruit growing. While up to a certain limit costly treatment with a view to a great crop will pay, we must admit that the risk of heavy loss increases often in proportion to the cost. It is hard to draw the line.

The great bulk of fruit on the market is grown by cultivators of but moderate skill and small means. They get low prices, and make small profits; but they supply a market in which high prices would be prohibited.

It is often said that large crops of choice fruit can be grown cheaper than the small or moderate crops of medium grade. But if so, why does not the former so increase as to exclude the latter?

Knowledge of fruit growing is evidently increasing, and all markets are being better supplied with fruit of a better average grade. Nevertheless, there is still a good deal shipped in, from one point to another, which is even too poor to sell at all. It is astonishing to see what withered stuff is exposed about the doors of the lower class of shops. The dealers may get a little out of it, but how large, or how small, is the grower's share?

One thing, above all others, should be urged upon by every horticultural writer, *not to plant more than you can properly care for*. Neglect of this fundamental rule is the cause of so many inferior goods. Every tree, every rod of ground, more than can be well cared for, lessens, instead of adding to the profits of the grower.

Is any Atlantic slope or interior valley market in America well and sufficiently supplied with those two excellent stone fruits, the plum and the cherry? They are among the cheapest and most plentiful fruits in Europe; then why not here?

Is it not because we have neglected to improve our native species? Are we not doing with these fruits as we long did with grapes? And is not the true path to be followed the same as with the grape, to develop our native species?

It may be granted that this is a difficult path for the individual to follow, though a young enthusiast might do much, who would make a life work of it. But now that we have some fifty well endowed experiment stations scattered over the whole continent, what should hinder immediate, intelligent and well organized activity in developing American fruits to their fullest capabilities? What is scientific horticulture good for, if not for this?

Growing seedlings of all our fruits, both from self fertilized and cross seed, is an easy work of great promise. See what has been done already in this way with the small fruits! As much is possible with all our tree fruits, if we will put our hands and heads to the task.

T. H. HOSKINS, M. D.

Northern Vermont.

CONFERENCE CORNER.

Where to Obtain Aquatics.—*Mrs. B. C.*—Almost anything in the line of aquatic plants may be obtained of E. D. Sturtevant, Bordentown, N. J., whose advertisement appears in THE AMERICAN GARDEN.

Prices of Nitrate of Soda.—*C. E. I.*—The article quoted by you at $3.75 a hundred pounds at St. Louis is the regular commercial nitrate of soda, 96 per cent. pure. The quotation to which you refer, of 15c. per pound, was for a chemically pure article.

Quantity of Nitrate of Soda to Apply.—*C. E. I.*—A liberal dressing for a vegetable garden, as black loam with clay subsoil, would be an ounce to the square yard, equal to about 300 lbs. per acre.

Pruning Blackberry Bushes.—*M. H. P.*—We have seen the device to which you refer as a blackberry bush pruner, but we find a pair of hedge-shears, or the Standard tree pruner on short handles, better for that work

When to Apply Nitrate of Soda.—*C. E. I.*—For the vegetable garden this should be applied in the spring and be *raked* in; spading would place it too deep.

Household Ammonia.—*C. E. I.*—This is an excellent fertilizer for house plants. For those in pots, sprinkle with a solution made by adding a tablespoonful of household ammonia to three or four quarts of water. It may be made as strong as a tablespoonful to a quart of water if plants are large ones. For hyacinths in glasses, a teaspoonful added to the water once a month would be sufficient.

Care of Canna Roots in Winter.—*C. E. I.*—The best plan is to take up the roots, remove the heavier soil, and store away in sand in cool cellar (not freezing) until time for planting in spring

Books on Small Fruit Culture.—*J. H. T.*—We refer you to "Fuller's Small Fruit Culturist," "Barry's Fruit Garden," and "Thomas' American Fruit Culturist," all of which may be obtained of The Garden Publishing Company, Limited.

Parker Earle Strawberry.—*C. A. W.*—No; the Parker Earle Strawberry now being introduced is not the same one which was talked of four or five years ago, though it bore the same name. That variety showed evidences of value during its first two seasons, but deteriorated so rapidly afterward that the stock, so far as known, was wholly destroyed. Of the variety now being introduced as Parker Earle better things are expected.

Shipping Cut-Flowers to New York.—*Mrs. R. A. S.*—We would advise you to write the dealers whose names we have given you, and ascertain what sorts and quantities of each they can handle. This will prevent confusion later on.

Grafting and Budding the Laurel.—*A. A. G.*—The native laurel can be budded on its own stock only, and that is done in the greenhouse in the winter. At best it is a difficult operation. Possibly the best way to preserve the specimens of which you speak would be to take them up in the spring with a good sod of earth, and cut off the tops of all that are over one foot down to within six inches of the ground. Mulch heavily all summer; also try them with good ball of earth and with top left on, and shade them from nearly all the sun by a frame piled with brush above them till September 1.—F. L. T.

Lettuce for New York Markets.—*S. J. P.*—The lettuce you sent was nice, but New Yorkers will have to be educated up to its use. At present there is nothing but the well-known varieties which will bring a price here. At your request we saw several of the best commission men and the steward of one of the leading hotels, but they would not handle it. We would suggest that you make arrangements through some reliable commission merchant in this city to supply some one of the large hotels with free sample packages of your lettuce in order to introduce it. It would in all probability be more advantageous in the end to find a market nearer home.

License for Peddlers.—*Florist.*—In this city the authorities require that all peddlers who do their business in the street from house to house, or by soliciting passers-by, shall have a license.

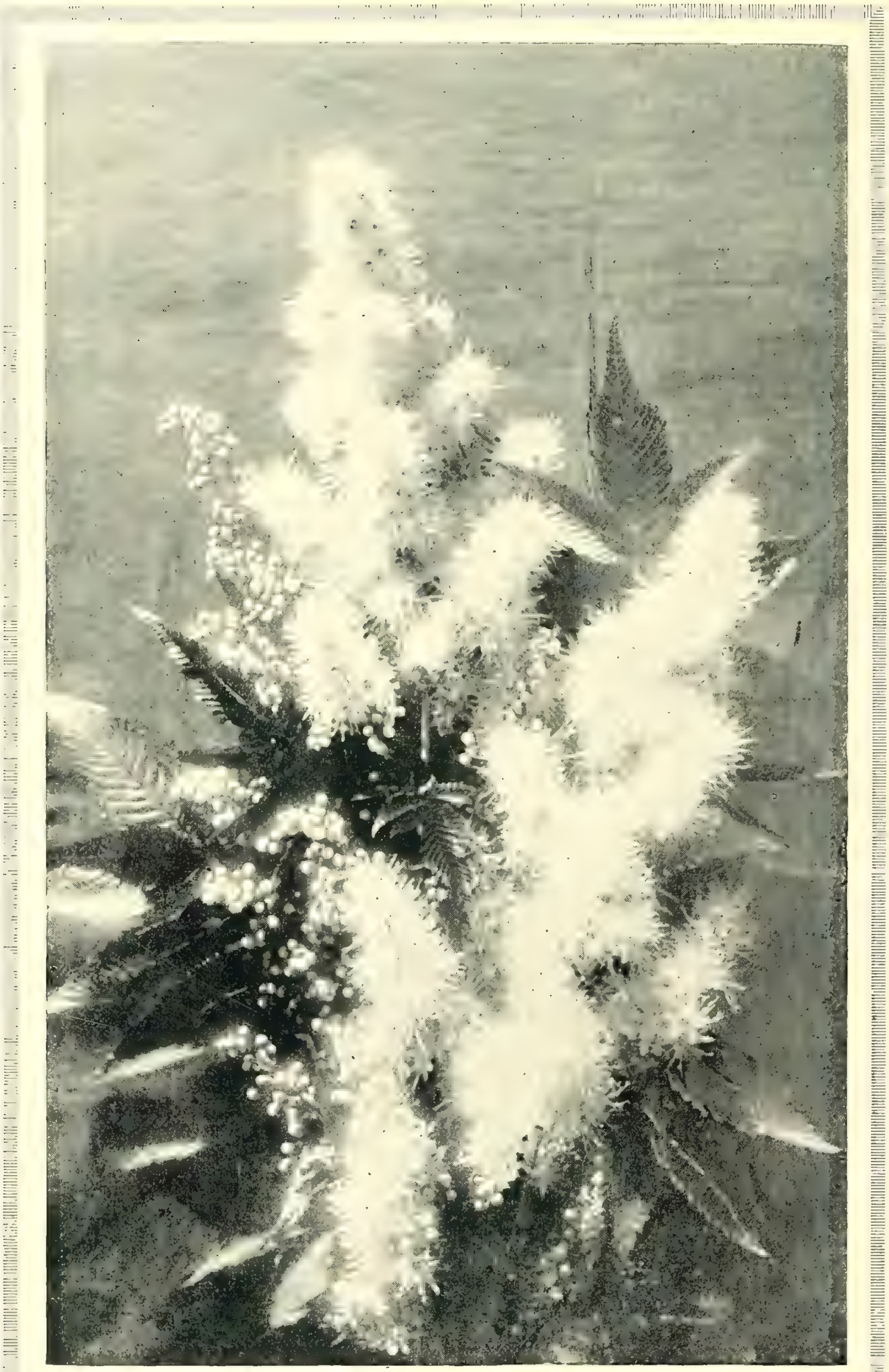
Cut-Flowers at Depots.—*Florist.*—To obtain the privilege of selling cut-flowers at any of the railway depots of the city, you would have to apply to the officer of the road having charge of the depots. The rent would be what might be agreed upon. In some cases the railway people only exact a small service each day in lieu of rent; in others they ask a cash payment.

Roses as House Plants.—*Friend.*—Don't; they were not designed for any such purpose; it is warring against nature, and all such attempts are disastrous. You may occasionally get a poor, sickly flower, and you will get myriads of green-fly as well. The place for roses is the garden or a suitable greenhouse

Carnations as House Plants.—*Friend.*—Again we say Don't. The temperature suited to the carnation is the one just above the freezing point, with all the light possible; that of the dwelling-house is both too warm and too dry.

Kenilworth Ivy.—*M. H.*—No; this is not any ivy, neither is it in anyway related to the ivies. Its botanical name is *Linaria Cymbalaria*; it is also known as the mother of thousands. It is a most desirable perennial climber or creeper, and for hanging baskets it has no superior among trailing plants. There are several sports from this species with variegated foliage; whether they will grow as vigorously, or whether they can be propagated from seed, which is produced freely, has not yet been tested. From what we have seen we are inclined to think the sports lack vitality.

[*Continued on Advertising Page 10.*]



Spiræa Sorbifolia.

The American Garden.

Vol. XI. MARCH, 1890. No. 3.

REINFORCEMENTS FOR THE ENEMY.

INSECTS and fungi appear to be increasing. In fact, they are increasing, if increase is measured by the experience of the horticulturist. We can scarcely suppose that, taking nature altogether, species are actually increasing, to any appreciable extent at least. But the cultivator finds new enemies every year, and in general he finds greater numbers.

This augmentation is partly apparent, partly actual. Nowadays we are looking for the enemy, while in other days he looked for us. Our vision is sharpened and we discover plagues which were overlooked but a few years since. This does not imply that the plagues may not be grievous: we may have known the results from childhood, but now we separate and diagnose, and we often find two or three things where we supposed there was but one. The man who chanced to write about blight fifty years ago probably covered the effects of a score of causes. We not only analyze more closely, but we publish more extensively. New plagues are quickly known, and our minds are in condition to receive an indelible impression of them. Scourges are no longer merely local in interest; we carry the burdens of the entire country. It is apparent, therefore, that pests appear to increase in part because we know more than we did last year.

But after all, the pests are actually increasing, yet less rapidly than we are apt to think. There are two methods of reinforcement.

First, insects and fungi, in common with all living objects, may change their habits. Insects are particularly adaptative to conditions. An insect fed upon wild plants in Colorado, occupying a limited area which was largely determined by the distribution of the food plants. A cultivated plant closely allied to the wild plants was carried westward to Colorado. The insects attacked it, liked it, and spread. The plant was the potato, and the insect became from that time the potato beetle. A maggot lived in wild thorns. But it chanced to find better and more abundant food in the cultivated apple. It spread, and became the apple maggot. A grub bored in oaks and other forest trees. The forest trees were lessened, and fruit trees were increased. The insect attacked the fruit trees and became known as the flat-headed apple-tree borer. An insect in Europe lived upon flowers of the figwort, occasionally attacking furs and clothes. It came to this country and attacked carpets, a habit which it does not possess in its native country. In America it is the carpet beetle. Instances of change of habit are abundant. In fact, such change is to be expected when insects find themselves under new or changing conditions. And to a lesser extent, the same is true of fungi. Cultivated plants are often infected from wild ones.

Second, pests migrate, and are transferred. We are carrying on a commerce of insects, fungi and weeds. Many of our worst insects came from Europe, and more are coming. But transfers have been mutual. If Europe has given us the codlin moth, currant worm, and scores of other pests, both insect and fungous, so we have returned with phylloxera and the grape mildew. Certain species of animals and plants appear to be cosmopolitan. They follow in the wake of settlement and trade. And it often happens that introduced species are the worst. There are certain definite reasons for this, which cannot be detailed here. It simply means that change of habit often follows change of place.

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It is commonly supposed, particularly in the case of fungi, that increased virulence of attack follows increased development of plants. The better the variety, the more highly it is bred, the more is it liable to fungous injury. The proposition may be true, but we need definite proof of it. It is true that there are instances in which highly improved varieties are more liable to attack than others, but the susceptibility may have no definite relation to amelioration. The tomato is an instance; the rot does not often, if ever, attack the cherry sorts.

But if pests increase, what of it? Such increase once meant discouragement or despair. It now means thought and labor. We know too much to repine; we are rapidly finding out that there is some way in which to combat everything. But there are those who say that it will not pay to combat; the cost may be great, and margin of profit is everywhere low. This proposition is not true. It always pays, immediately or ultimately, to save crops. And the man who saves his crops reaps a double reward, for the chances are that his neighbor has lost his, and production is lessened. The curculio is a blessing to the thrifty man, inasmuch as it prevents the multitude from growing plums and peaches. Effort always pays, and it is the enemy which incites it. "Flowery beds of ease" are poets' dreams. They would make idlers. Weeds have taught us to cultivate the soil.

L. H. Bailey.

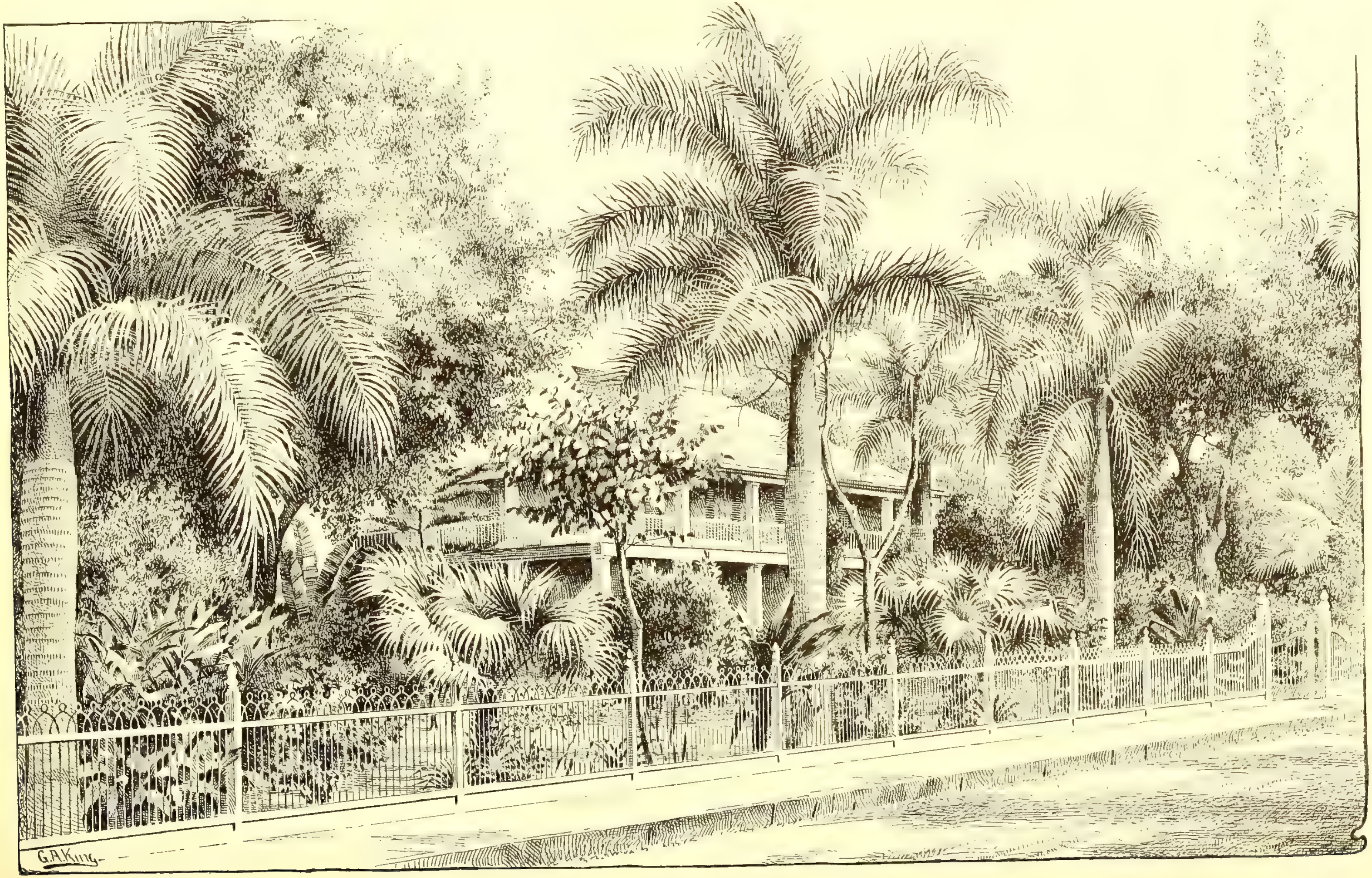
HAWAIIAN VEGETATION.

THE stranger in the Hawaiian Islands finds himself in a new world—a land of eternal bloom and verdure—over which, like a benediction, rests an atmosphere of peace. With a temperature that averages 80°, a soil naturally rich, and frequent, copious showers, plant life, in its most luxuriant varieties, attains the highest perfection.

As none of the eight islands has exactly the same climate as the others, different trees and shrubs are peculiar to each. The island of Hawaii, upon which is situated the famous active crater of Kilauea, is considered the most tropical. Here are raised the celebrated Kona coffee and delicious thin-skinned oranges, and ten of the fourteen miles of the new route to the volcano are through dense groves of pandanus or lauhala trees and magnificent forests of feathery fern-trees. Kauai is known as "The Garden Island;" and certain small plants, such as the "silver sword," are indigenous to the colossal crater of Haleakala, on the island of Maui.

If one wishes to obtain a bird's-eye view of the fair Hawaiian capital, on the island of Oahu, he has but to climb the rambling slopes of the extinct old crater, Punchbowl, in the rear of the town, and from its summit look down upon the beautiful "summer city by the sea," literally embowered in a wealth of foliage, roofs and church-spires peeping out from a maze of cool, green algarobas (members of the locust family) and various species of palms. It is difficult to credit the assertion that this spot was once entirely unshaded, and was first laid out in trees by the early missionaries. The maneanea, or Bermuda-grass, carpets with emerald turf hillsides, lanes and by-ways, and the lantana, a kind of wild verbena, raised in hot-houses in America, is gradually covering the rocky sides of ancient volcanic peaks.

Guarding the sea-coasts, sentinel fashion, is that exceedingly picturesque tree, the cocoanut, described by Mark Twain, the irrepressible, as "a gigantic feather-duster struck by lightning." Nevertheless it is the prince of palms, and sometimes reaches the height of 120 feet. No tourist should consider his trip complete in detail until he has seen some agile native perform the feat of scaling its long, slim stem to obtain the cocoanuts. The uses of this tree are many and varied. Its trunk supplies material for the manufacture of boats, furniture, fishing-poles, etc.; from the fiber are woven ropes, mats and fish-nets; the shells are used for cups or bowls, called calabashes, which are often beautifully carved and polished; the milk of the nut is a refreshing drink, and the young meat may be eaten with a spoon, like custard, or used when riper in different ways in cooking. The leaves are utilized in thatching grass-huts, and are also burned for fuel or saved for fodder. Cocoanut oil is also a well-known product of this invaluable tree. Other palms are numerous. The approach to the Queen's Hospital is through a noble avenue of stately date palms, with tempting clusters of luscious fruit. Majestic, indeed, is the Royal palm, which grows abundantly, there being no less than eighty of its representatives in the private grounds of one of Honolulu's prominent citizens. Fan palms are seen on every side, together with dragon palms, yuccas, Spanish-bayonets and palmettos.



A VILLA IN HONOLULU SANDWICH ISLANDS.

Among other trees, useful or ornamental, which grow in greater or less profusion on the different islands, may be mentioned the bread-fruit, with its golden spheres, the alligator pear, the pride of India, the tamarind, the curious banyan, the kukui or candle-nut, the iron-wood, the monkey-pod, the sweet-scented sandal-wood, which is gradually diminishing in the forests, the traveler's-tree, the olive, the paper-mulberry, from the inner bark of which the Kanakas manufacture a parchment-like cloth called tapa, used for mats or clothing; and the kou, koa, and other timber trees, which furnish a handsome wood, much used in the construction of choice furniture.

Large plantations of fine bananas are an ordinary sight in this favored land. Where the American householder places, in pantry or hall-way, a box of red-cheeked Baldwins, the head of the house in Hawaii hangs a cluster of this wax-like fruit. At certain seasons of the year, a generous bunch may be purchased for the trifling sum of 25 cents, and not seldom they are given away entirely. Other native fruits which, to a greater or less extent, may be had for the gathering, are the ohia, or mountain apple; the pomegranate, the artichoke, the pineapple, the guava, the rose-apple, the papaya, the custard apple, the mandarin orange, the ohelo, or huckleberry, the mango, the lime and the lemon. Some fruits of the temperate zone have been cultivated with success; but, as a rule, they do not take kindly to the foreign soil, the peach, for example, being small and slightly bitter. Grapes are raised with sedulous care, but are often stolen before reaching perfection by the nimble-fingered Portuguese.

Sugar-cane, being the staple product of the islands, is abundant everywhere; but on the great sugar plantations one is fairly bewildered at the outlook over the broad acres of rustling, saccharine stalks, each tipped with a delicate nodding tassel. The fields are very fertile, producing three or even four different crops. Irrigation being necessary for its best development, the cane is grown mostly on plateaus or on the level ground. The puffing smoke-stack of the sugar-mill, in the midst of a large cane-field, suggests an ocean steamer homeward bound over billows of living green.

The face of the open country is cut up into numerous taro patches and rice fields, the water in both cases being confined by solid banks of grass. The taro, of which there are many varieties, much resembles the calla. From its root is made that singular compound, poi, which is the "staff of life" of the native Hawaiian. The young leaves are sometimes cooked like spinach and are very palatable.

The prickly pear cactus abounds on every rocky hillside, and the quaint and beautiful night-blooming cereus well nigh conceals the stone walls inclosing the premises of Oahu college in the suburbs of Honolulu. As we roll leisurely along through quiet, shady streets, on one side we behold jungles of the tall and graceful bamboo, or the dwarf rattan, and on the other the bright scarlet berries of the coffee-tree, or the asparagus-like stalk of the century plant. Truly this is the land of flowers! The oleanders are one large bouquet, and load the air with their fragrance. The bougainvillia, a hardy vine of a deep crimson, runs riot over fences, houses and palm trees in a mad luxuriance of bloom, and the hibiscus, or celestial rose, with its flame-colored bell and golden tongue, is a prominent feature in many gardens. Wide-spreading passion vines are trained over verandas and carriage drives, as screens from the heat of the tropical sun and the glare of the ocean. Among other flowering plants are the Cape jessamine, the stephanotis, the tuberose, the ginger and the Indian shot, besides our own familiar geraniums, heliotropes and roses, which flourish amicably with their foreign neighbors.

Vegetables are raised by the industrious Chinese, sweet potatoes, yams, lettuce, cabbage, musk and watermelons being cultivated the most extensively. Peanuts and tobacco are also grown, and small, sweet strawberries are obtainable at any time of the year.

Of ferns there are about 150 varieties, the largest being the tree-fern, the bird's-nest fern, the pulu, the scented fern, and the mammoth Australian maiden-hair. They hide in the dark romantic forests; uncurl their fronds on the banks of rapid streams, or in the deep ravines of cloud-capped mountains, or clothe the sides of frowning precipices over which dash sparkling waterfalls. Ferns, flowers, seeds, beans and vines, especially the glossy maile-vine, a species of smilax, are all employed in the construction of "leis," or garlands, worn by native women and men alike on every possible occasion, and which are thrown, by well-wishing friends, over the head of the traveler as he reluctantly bids "*aloha!*" to the verdant isles of Hawaii Nei.

BERTHA F. HERRICK.

Alameda County, Cal.

PEACH CULTURE.

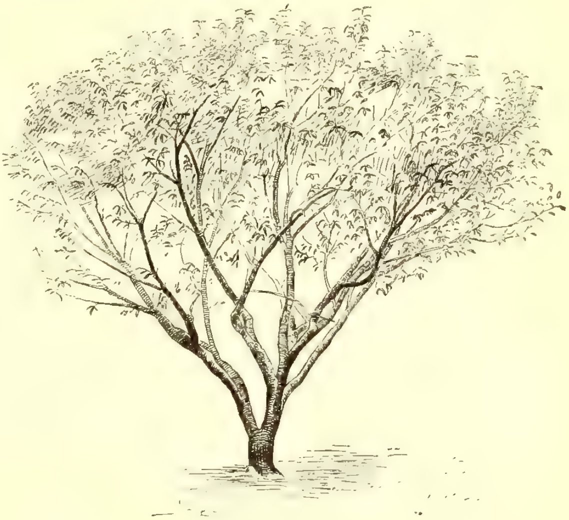
WITH PARTICULAR REFERENCE TO MICHIGAN PRACTICES.

Clean cultivation, abundant fertilizing, thinning of fruit, warfare against insects and yellows, honest and tasteful marketing—these are the prime essentials to successful peach culture. These mean labor, expense, and vigilance. Comparatively few are willing to prosecute these requisites into details, and for this reason the industry is profitable to those who overcome.

The best peach lands are light or even sandy lands. Upon such lands the trees ripen their wood well and early, and they are uniformly productive. But light land does not mean poor land. The land must be enriched. Many manures are good. Stable manure is best when it can be had. It is applied liberally broadcast and is plowed or harrowed in. Ashes are good, but the quality of the purchased lots is variable and is often low. 30 or 40 bushels to the acre of unleached ashes is a common dressing. Chemicals are always good if they are used intelligently, but their application is usually hit and miss. It is always best to buy the chemicals or raw materials and make the mixture for the occasion. A combination of stable and concentrated manures is usually preferable to either alone. For fruits, potash is particularly valuable. Green manuring with rye has come to be a settled custom in most Michigan peach communities.

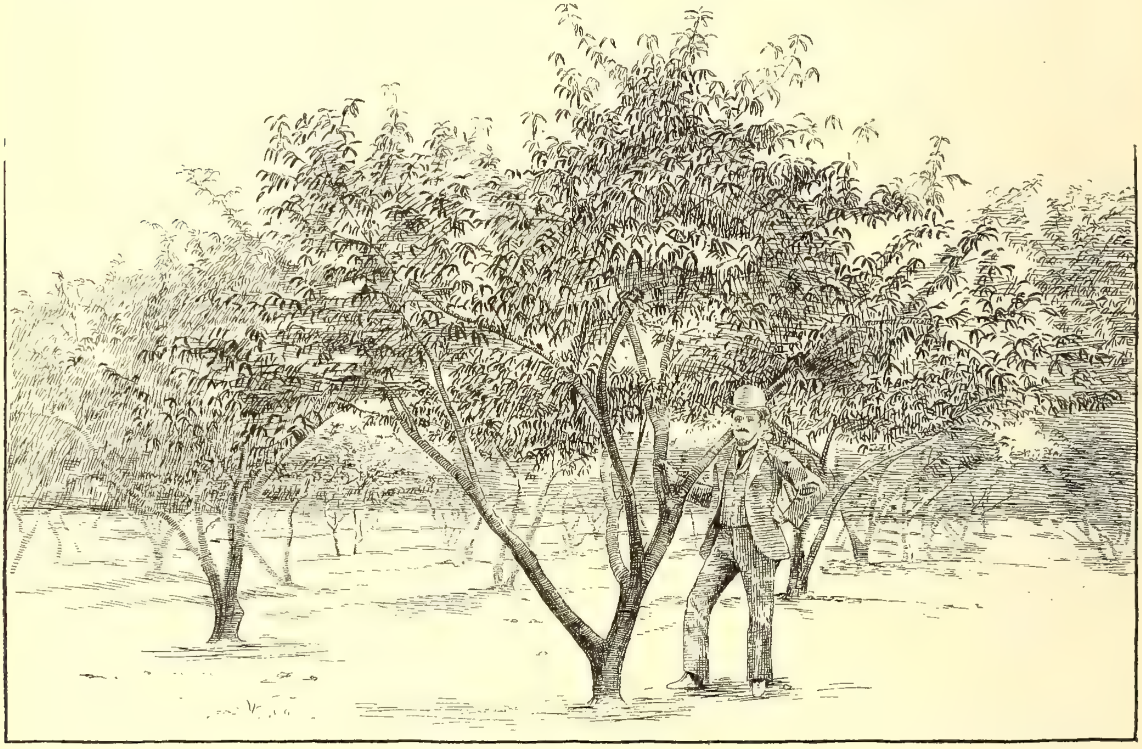
Sight and aspect are always important in peach growing. They must be determined by the local conditions. High lands are always best because of their atmospheric drainage and because the soil is likely to be more congenial to the peach. High sites are not valuable because they are windy sites, although there is a common notion to the contrary. The essence of their value lies in their drainage of cold air. Windbreaks are always desirable, but they must be adapted to the conditions. In the north, peaches are usually grown near large bodies of water for protection, and the winds off the lakes are warm winds. To stop these winds by dense plantings or by the adaptation of forests is usually injurious, but a thin shelter belt breaks the force of the wind and affords great protection to trees laden with ice or fruit, and lessens windfalls; and is not productive of injury.

The favorite aspect in the vicinities of the Great Lakes is one which faces the lake, but if the site is good the particular lay of of the land is rarely considered. But in interior places, aspect is more important. A southern exposure often means earlier flowering and increased liability to injury from late frosts. But the immense body of water in any of the large lakes warms up slowly in spring, and trees near them start later and escape frosts. I have many times noticed a difference of two weeks in time of blossoming of peach trees in places 20 miles apart, one of which lay along Lake Michigan and the other inland. Outside the influence of the lakes, spring frosts do more damage than cold winters.


Model Peach Tree Ten Years after Planting.

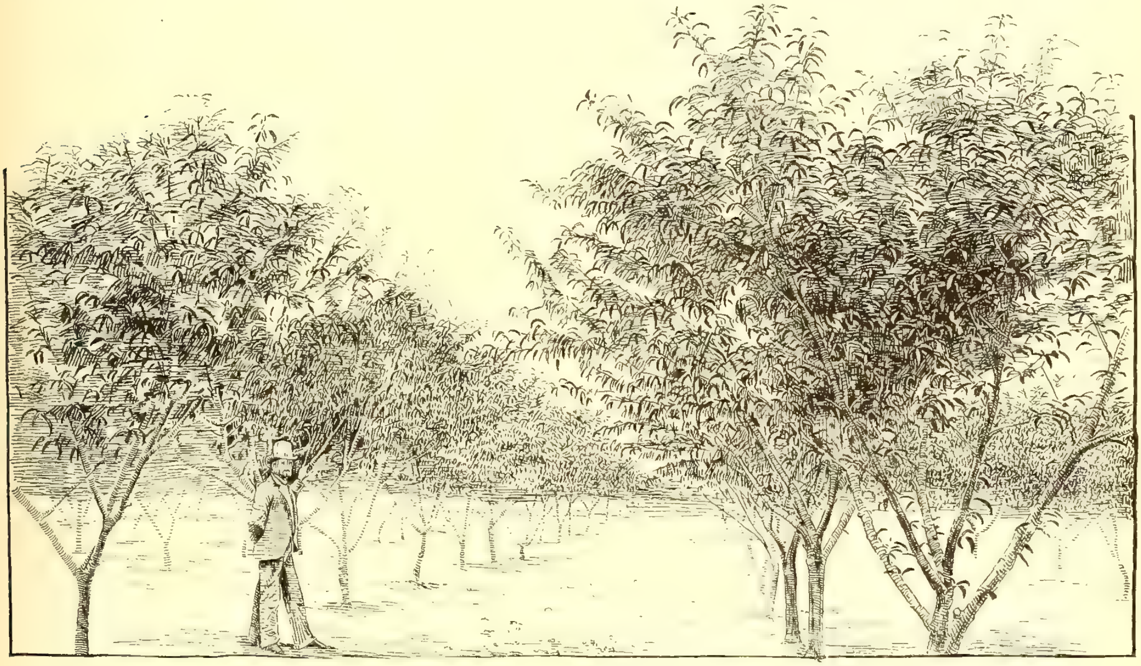
One year from the bud is the accepted age at which to set peach trees in the orchard. First-class trees are none too good. Spring planting is usually preferable to fall planting. When the tree is set, all the limbs are cut back to one bud, or the feebler ones are removed entirely. If the tree is tall and slender, the leader should be headed back, but good trees do not demand such treatment. Still the practice of heading back can hardly be objectionable. 20 by 20 feet are the usual distances apart for setting, although closer planting is sometimes practiced. But the wider planting gives better trees and better fruit, and renders labor easier.

There can be no royal advice for the pruning of a peach tree, or of any tree, in fact. The essential points to be secured are these: a low head and a thin one. Apple trees require high heads because they grow large and eventually the limbs droop more or less, and the trees are strong enough to endure rough treatment at picking time. But peach trees are not apple trees. Peach trees can be trained low and yet never intefere with cultivation; and they are not to be climbed into promiscuously, as apple trees are. Two feet from the ground is high enough to start a top. Most growers prefer even a lower top. From four to six good arms are trained to form the top. Subsequently pruning consists in thinning out half the small wood each year. This thinning improves the tree and thins the fruit as well. The pruning is done in late winter when labor is cheap, and leisure greatest. The shortening-in system is not practiced in Michigan, nor can I see any important reason for employing it when trees are properly grown. The three excellent illustrations are object-lessons in pruning. A model peach tree at 10 years of age is as thin-topped as fig. 3, even in June, when the leaves are out. This illustration, as well as the others, is made from a photograph.


A Model Peach Orchard Six Years Planted.

"I will give you $100 if you find a weed in my peach orchard"—and I could not find one on ten acres! This is by no means an unusual condition. No garden along the Seine was ever cleaner than many of these peach orchards which skirt the eastern shores of Lake Michigan. In May a crop of rye, which was sown the last of August or September, is plowed under, and from that time until rye is sown again the harrow and cultivator are constantly at work. Whether or no tillage is manure, tillage is success. But with the sowing of rye, tillage ceases, and the trees harden up their wood. Rye assists in keeping the ground clean, and affords a tolerable manure, and it is supposed to afford protection to the trees. When the peaches are as big as little marbles, thinning has begun. This thinning is done by hand—a slow process, but always a profitable one. Good peaches sell. How much to thin must depend upon the variety and the condition of the tree; but it is a common rule that no two peaches when ripe shall touch each other. The crop looks sparse and scant enough when thinning is completed, but the spaces are soon filled.

The insects must be conquered. Borers should be dug out in fall and spring, and they will soon cease to do much damage. Put little faith in external applications to kill or discourage the borer. Lazy methods are in the end expensive ones Curculios are caught on sheets, and some still use also the methods of catching them under chips. Catching the curculios means early rising and persistent effort through several weeks, but if the insects are abundant the effort pays. Begin as soon as the blossoms fall. Spraying with arsenites is not yet a practice; it is but a rude experiment in the hands of a few growers. But the practice will establish itself some day. We only need to learn a few more details and to practice nicety of application.



A Model Peach Orchard Ten Years Planted.

Yellows is not to be regarded as a curse to peach growing as a whole. It simply weeds out the shiftless and unprogressive growers. The men who have endeavored to argue it out of of their orchards have been distanced by those who have dug it out. And we shall all sooner or later accept the radical method of treatment or go out of the business; it is but a matter of time.

Honest and tasteful marketing never pays better than in peaches. The fruit will always rank among the luxuries in Northern markets, and luxuries must be attractive. Small gift packages are the best. Bushel baskets usually contain the poorer peaches, or at least the second grade. A customer does not purchase a bushel basket as a dainty present to his wife or sweetheart. Uniformity in grading the fruit must be imperative. It is always allowable to turn the red cheeks uppermost on the package, but there must also be red cheeks throughout the basket. The man who puts up the daintiest packages is the one who gets the best prices. But a dainty parcel demands fine fruits. The immature, woolly, green and hard peaches one too often sees in the markets may as well be sold in grain bags, or shoveled from a wagon into a dry-goods box.

Varieties are always local considerations, yet, none the less, among the most important. Varieties are often matters of fashion rather than of merit. Old sorts, which have fallen from the lists, often reappear; the old Barnard is now reappearing along the Michigan shore. The following sorts appear to be finding the most favor at present in that region Hale's Early, Lewis Seedling, Mountain Rose, Barnard, Snow's Orange, Yellow Alberge, Jacques' Rareripe, Switzerland, Hill's Chili, Golden Drop—a local variety—Smock.

Cornell University. L. H. Bailey.

TARRYTOWN LETTERS—V.

BY A. B TARRYER.

OH, THESE WOMEN!—"HORTICULTURE IN THE PUBLIC SCHOOLS"—TIN-CAN FLOWER POTS—BOTANIC VS. COMMON NAMES OF PLANTS—MRS. TARRYER CALLS ON THE WISDOM OF THE GRANGES—WASHINGTON LEGISLATORS BROUGHT TO GRASS.

DELIGHTFUL it is to find our old friend Thomas Meehan dropping suggestive paragraphs into THE AMERICAN GARDEN, and curious to observe that in both instances, in the January number, he has run across Mrs. Tarryer's hawser, or, rather, that good lady's street-yarn.

Oh, these women! It is no wonder Rev. Joel Howe's biographer lets him stamp his cane down hard, and say: "*I wish there wasn't a woman in the world!*" No sooner than we get our little systems fixed to our minds, than some woman will whisk her skirts around and knock them over—or else she will bring up a boy to do it.

For my part I was believing what Mr. Meehan said under "Horticulture in the Public Schools," about the impossibility of growing geraniums in a tight heir-loom of a wooden flower-pot, with a savings-bank of paper money in the secret bottom. But no sooner had I read the piece to Mrs. Tarryer than she stepped into the other room, returning with her arms full of the most beautiful young geraniums in bloom, all from slips, and every one of them was growing luxuriantly in tin cans, tight as a bottle, and covered nicely with maroon colored paper!

"There are lots of coal-clinkers for drainage in the bottoms," she said. "It is a good way to raise plants from slips. The earth below and at the sides never gets dry. But we must be careful and not water too much. The principle involved is not greatly different in effect from that of the hard-pan in some parts of our garden, is it? A false bottom to these cans could be stuffed with bank bills and take no harm, you see."

Mr. Meehan will pull himself together, no doubt, as I did, for this view only shows, as he said, that plant life should be a study of the first importance in all schools, and indicates an abundant source of outfitting material of all sizes for potting. Nothing can be handier than those papered tin cans. The vigor of foliage and wealth of blossoms soon covers the handsome pots out of sight. They stand on shelves, tables and windows much closer than flaring vessels, and are cleaner to handle.

The other point—referring to what Mr. Meehan says on page 56 about common and botanic names—he half yields to Mrs. Tarryer already, because it is right in line with his life-long thinking and writing, and because she is a pronoun of multitude, covering an immense number of women, who will have an advance in popular education.

There must be something like uniformity in the common speech of the people regarding the plants that are of use to them, or else civilization comes to a stand. This is the more needful since railways are fetching everybody together and making all sorts of grotesque provincialisms seem more absurd by scattering them. Mrs. "Pomona" Tarryer had the "parrot's own" time among the granges while she was proving that farmers know a great deal about grasses if they only had the genuine names to convey the knowledge.

One time in a grange she arranged with her sister Graces (Ceres and Flora), to see how much the men-folks really did know about their own business. There was company present; one or two retired clergymen, first-rate gardeners; quite a gathering of deacons, elders and select men from out of town, besides a strong local muster of our most careful and influential farmers—old diggers, all, and men of bank accounts—the fathers of rural and urban society, with their wives and daughters.

Mrs. Tarryer took these stalwart husbandmen on a question of the number of grasses each had seen and could describe—from memory, mind you—in his meadows, pastures, gardens, fields, swamps and road-sides. She begged them *not* to mention names at all, but to confine themselves to telling how each grass looked—how and where it grew, and so forth.

This put all hands on their intellectual muscle, so to speak. The characteristics of some twenty or twenty-five grasses were spread before us with such photographic particularity that every old weeder and hay-maker in the grange knew them at once. Any naturalist would have envied the crisp and concise language of these descriptions. They detailed the appearance and habits of the plants referred to throughout the entire season, proving familiarity with their life-history. But the names given were a caution to public educators!

The advice *not* to mention names, produced, on the contrary, a wonderful flux in that respect, for a while, from all parts of the grange-room. Perhaps Mrs. Tarryer meant to, though more likely she couldn't help it. But when a number of these venerable fathers had fully aired their vocabularies in the most gracious manner, giving out the few names that had been handed down in their respective families with a certain degree of unction, the effect was seen to be somewhat ludicrous by the young people present who were watching closely and there was a halting and a looking to and fro among the stalwart speakers!

By referring to the minutes of the secretary—a vigilant sister—it was found that *seven* different *blue—six twitch*—"or a kind of a twitch"—and *five June* grasses had been noted and accurately described. This was too much! If our farming people were not the most conservative and orderly in the world there would have been a great row in that meeting! As it was, everything ended pleasantly.

The fact is, "crops" and "weeds" are the two general classifications most used in agriculture. These may rarely come to speech and only be in mind. If boys or girls ask what such or such a plant is and it is named by an elder, the name may soon forgotten and the plant as well, unless it be persistently useful or troublesome. But an exact knowledge, though perhaps unspoken—of the plants it has to deal with, is fixed in rural life, otherwise it could not exist. The plain duty of science is to get on its farm and garden boots and blow the chaff of scholastic ages out of its own names of needful plants so the people can use them. We have very few grass names *common* in this country. It is a waste of time to rake together, revive and print the obsolete nick-names which never had and never can have general circulation. They are of no use, except by their dead weight to sink the whole in oblivion.

For the plants we must take stock in, we need legal denominations as exact as we have for money, and as current wherever we travel. The farmer, gardener, writer or statesman in debate who cannot give the systematic names of the plants he uses is practically dumb in this generation.

Likewise the botanist or teacher of agriculture and gardening who cannot name useful plants by their appearances dwarfed in the sod, is not equipped by his schooling for the ordinary arts of life. Some of our grass books—Low's "British Grasses," to wit—have double columns of botanic synonyms, that so far as our new prints are concerned, should be tied, neck and heels, with our mobs of local *aliases*, and deliberately forgotten as useless lumber.

Have I intimated that farmers are suffering more than other classes in the dearth of means for communicating ideas respecting our common grasses? Let me correct the impression, for the whole country is waiting for our experiment stations to do something about it. Some deny the state right to go blundering, and assert that the Department of Agriculture should lead us. Every agricultural editor and writer is waiting for somebody to find out about "grass." Within three months the polite world will be tearing its hair and discharging gardeners in vexation at the annual grass that is ruining its lawns.*

When Chairman Hatch, of the House Agricultural Committee, put his thumbs and fingers instructively together before him and said: "I suppose you know, Mr. Tarryer, that there are *two* kinds of 'blue grass'—I had to interject, hastily, in dread of a quarrel, for there were very positive gentlemen from widely different sections of the United States in the committee-room—"Yes, sir—there are *three*, and *five*—and"—dropping my voice to a whisper—"*seven* kinds of blue grass in some agricultural circles—*that's what's the matter, sir.*" Luckily Mr. Hatch took the hint and dropped the subject.

Some politicians fancy it is all their official life is worth to mention the right name of a grass now, in a farmer's meeting. Perhaps it would be for some of them. Uncle Jerry Rusk has a good story he likes to tell about some municipal embankments he had turfed with a grass that held on while the other fellows' banks (who laughed at him), "WENT DOWN, SIR!—WENT DOWN!" But he was stuck in naming the variety till one suggested "the kind that grows through potatoes?"† "That's it"—said he.

Systematic names go easier in journalism because writers are not by when the average editor—galled by old blunders he had no means of detecting—winces. But there is no need to be timorous about using the simple Latin name for a grass when we are sure we are right. Let us have the courage

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**Panicum sanguinale*, probably.—ED.]

†*A. repens*, no doubt.—ED.]

to call a spade a spade, and *not* call a mattock a "grub," nor a small variety of oak or pine a "scrub," instead of a shrub—as though we had learned our English of somebody's coachman instead of our fathers and mothers.

In private conversation, when it comes to grass-names, we must do the best we can to be agreeable, of course. But in public let it be understood that *Phleum** is shorter and easier to speak, besides being older, more exact, unmistakable, and of far wider currency than any other name for the same thing. So is † *Dactylis*—likewise ⸹ *odoratum*. More and more people would be using these and other scientific terms if writers and speakers would not go crawling after vulgarities that else would soon be forgotten. Nobody, black or white, will sit in a negro pew, or ride in a second-class car if they can help it. Why not take first-class names? And for naturalists to deal in nick-names when they have the world's proper names for things at their tongue's end, looks as if they were hedging the people out from their craft instead of inviting them in like liberally educated and liberal men.

In a former number of the GARDEN a Paris correspondent saw some fine turf grass he admired in the skirts of the city, but he didn't tell what it was, and so lost one chance to please Mrs. Tarryer and interest thousands of people who are inquiring.

Years ago, while Mr. Meehan was conducting the famous controversy among orchardists about the propriety of growing grass under fruit-trees, my feeling was that both sides might be in the right if only the grasses they favored or objected to were named. The discussion led to no economic common-sense because "grass" in those times may have included all the legumes as well as grains that could be grown in an orchard. Had anyone given the names of grasses in the dispute—discriminating between such dwarfs as *Poa annua* and *trivalis*, and a deep-rooted thing like *D. glomerata*, saying the weak turf of the former could do the trees no harm while making the ground tidy and keeping fallen fruit out of the dirt; but that the latter on thin soils must rob trees of moisure and fertility, then the question of grass under fruit-trees would not be so unsettled to-day, and we should be farther along in the names and individual uses of our common grasses. New names of plants, like those of new states, towns, postoffices and young babies are to be expected, and will affect only those who meet with the things the names apply to.

[*Herd's-grass or Timothy. † Orchard grass, or Rough Cock's-foot. ⸹ Sweet Vernal grass.—ED.]

THE ORIENTAL PLUMS AND THE GOUMI.

Out of the 17 varieties of Oriental plums, I fruited 10 varieties last season. I find them much better adapted to the south than any plums which have come under my notice; most of them are curculio-proof, prolific and of good flavor. In size they range from that of the Wild Goose to that of a large hen's egg. They have given me a succession of fruit from the latter part of May to the middle of August, and the Kelsey, which is the latest, will extend the season into September. I think that they will bring fancy prices in the northern markets. I believe that it would be good policy for the strawberry growers of the south to set out half of their plantations to these plums and raise fruits for northern shipment.

In all the Gulf States these plums thrive and grow to perfection. I see reports from a few of the eastern and western states to the effect that the few that have been tried are found to be hardy, except the Kelsey, which is the tenderest. I hardly think that the Kelsey will do much above the fig belt, while the others, such as Satsuma, Hattonkin 1 and 2, Yasobe, Sweet Botan, Ura Beni, Engre, Chabot, Yellow Japan, Ogan and Masou will do well far north as Missouri an d Kentucky. The Botonkio is the only variety that blooms too early. The frost generally catches it in full bloom here. I suppose that it will be reliable where the Peen-to peach is grown. Most of the other varieties bloom with or after the Wild Goose. The widely circulated statements that these plums will not thrive above the orange belt have hindered their introduction into the north. Many still believe that geographical adaptation of this fruit is with that of the semi-tropical fruits.

The Goumi is an interesting little fruit with which we are now becoming familiar. It is the *Elæagnus pungens* of botanists. The leaves of this shrub are evergreen, the under side silvery white. The fruit is oblong, like the cranberry, and is said to be fine for jellies, owing to its sub-acid qualities. It has the taste of the strawberry, but is slightly puckery, like the persimmon. It is propagated from the seed, and bears quite young. I have plants two feet high loaded with fruit. It is a pretty sight to see such lilliputian plants in full bearing. The shrub is perfectly hardy in Avoyelles parish. I do not know if it will succeed farther north, but it certainly deserves a trial, as it could easily be protected on very cold days, owing to its dwarf habit.

Central Louisiana. J. L. NORMAND.

A RACE OF FLOWERLESS PLANTS—II.

THE METAMORPHOSES OF FUNGI—
HOW DIFFERENT FORMS CHANGE INTO EACH OTHER.

METAMORPHOSIS, or entire change of form, is a familiar phenomenon in insects. The caterpillar becomes a chrysalis, the chrysalis a moth. In some birds, the plumage of the adult is very different from that of the young. In many marine animals, the offspring is not like the parent but like the grandparent; one form is alternated with another, generation after generation. It is so also in ferns; there is the inconspicuous sexual generation coming from the spore and the asexual generation, the "fern" as we ordinarily see it, bearing the spores.

Analogous or similar, or even more complicated cases are frequent among fungi. Most persons are familiar with the yellow, jelly-like balls that occur on cedar-trees in spring and are called "cedar apples" (Fig. 1). This is a fungus, and the common rust on the apple is merely another stage of the same fungus. After the first warm rain in spring, the jelly-like appendages of the cedar apples become greatly enlarged, and imbedded in them are spores such as are shown highly magnified in Fig. 2. The lower spore in Fig. 2 has germinated and has formed secondary spores. The latter can easily be obtained in large quantities by placing one of the cedar-apples on a saucer containing a little water and covering it with a tumbler. As soon as germination takes place, the secondary spores are scattered in a yellow layer over the saucer. In nature, these spores are carried to an apple or wild crab-apple tree, where they germinate and produce the rust, like that in Fig. 3. The rust appears as yellow spots with black specks on the upper surface of the leaf, and clustered cups with a fringed margin as shown magnified in Fig. 4. The cups which appear in late summer are filled with spores of a different kind from the others. They in their turn are carried back to the cedar tree and there produce cedar-apples which live over winter and grow in the spring as before. I found last August an apple tree so yellow with rust that it was conspicuous half a mile away, and under it was a young cedar tree bearing many old cedar-apples and multitudes of new ones.

The history of wheat rust is similar but more complex. Beginning with the cluster-cup stage, we find it on the barberry, not in fall, but in spring. Fig. 5 is a magnified section through a barberry leaf, showing the black specks like sunken flasks at the upper surface, and the cluster-cups on the lower. This form, when growing, possesses remarkable beauty; the cups, seated in clusters on red spots, are cream-white wax-like cylinders leaving a fringed margin, and are filled with spores. Long before it was understood scientifically, farmers were convinced by observation that wheat could become infected with rust from barberry bushes. This belief was so strong that a law was enacted in Massachusetts in 1755, entitled "An Act to prevent damage to English grain arising from Barberry Bushes." It was not till more than a hundred years later that the connection of the barberry fungus with wheat rust was demonstrated, but since that time the facts have been abundantly veirfied by repeated experiments.

Briefly stated, the facts are these: The barberry cluster-cup fungus (Fig. 5) appears early in spring on the young leaves. The spores of which the cups are full, are scattered by the wind, being carried with much greater ease than ordinary dust, because they are so much lighter. Many doubtless perish, but some, falling on "good ground" in the shape of wheat, oats and other cereals and grasses, germinate, penetrate the plant, and produce easily a thousand fold or more, not of cluster-cups but of rust spores. Two kinds of spores are formed sooner or later, constituting what farmers and botanists call red rust and black rust of wheat. The red rust comes first, and is characterized by oblong orange-colored spores of a single cell, on stalks which easily fall. Black rust comes later on the same mycelium or plant, and often in the same cluster, and is characterized by dark colored spores having a partition across the middle, and persistent stalks. Fig. 6 contains three spores of red rust and one of black rust. Fig. 7 is a cluster of black rust spores. The red rust spores are rapidly scattered, germinate and produce red rust again, perhaps several generations of it, before the black rust spores appear. The latter are more permanent; they live over winter and in spring germinate, infect the barberry bushes and produce cluster-cups again.

Wheat has three distinct species of rust; the one just described is called *Puccinia graminis*, another *Puccinia Rubigo-vera*, and the third, which is commoner on oats than on wheat, is *Puccinia coronata*. All three have similar histories, but their cluster-cups do not grow on barberry. A fourth species, which grows on Indian corn, is not known to have any cluster-cup form.

It is easily seen by a comparison of the figures, that wheat rust and apple rust belong to the same class of fungi. The black rot of the grape and the black knot of the plum trees both belong to another class, which have one of the kinds of spores in sacks (Fig. 11 and 15).

The black knot of the plum trees is one of our best known and most destructive fungi, making plum culture a failure in many places. It might easily be combatted with considerable success if cultivators would only make the effort. Its life history was worked out with great accuracy by Prof. W. G. Farlow, of Harvard University, in 1876. In the spring a new knot forms, in many cases as an extension of an old one; the branch on which it forms swells and cracks open. The microscope shows certain spores borne on the tips of threads and called conidia (Fig. 8). The knot grows on and acquires a crust-like surface which becomes marked with small pimples. These pimples indicate cavities in which spores are formed. Some of them (Fig. 10) contain spores in sacks (Fig. 11) which become mature in February. Other cavities contain spores of three different kinds, none of them in sacks. Fig. 9 shows one of these kinds (*stylospores*) which are borne on the slender stalks attached to the walls of the cavity. This fungus then has five different kinds of spores, two of which (Figs. 8 and 11) are of special importance, the conidia and the sack-spores.

The black rot of the grape (Figs. 12–15) does not appear to be quite so intricate as the black knot. Two of its forms are especially important. (1) the sack spores, shown in a cavity, somewhat magnified at Fig. 14, and simply in their sacks, more magnified, at Fig. 15; (2) the stylospores, seen oozing out of their cavities, somewhat magnified, at Fig. 12, and in a section, more magnified at Fig. 13. The latter were, until recently, the only kind of spores well-known in this fungus, and are the only ones seen in great abundance. They grow on the leaves as well as the fruit, and naturally having a different appearance on the leaves, were thought to be a distinct species not particularly injurious. They were therefore disregarded, and remained a constant source of infection for the fruit.

These examples are merely familiar illustrations of thousands of similar cases, some of which have been investigated but most of which are yet but poorly known. How shall such plants be named, or if, as frequently is true, each form has its name or even several names, what shall be the name of the fungus as a whole? To the black knot only one name was originally given, *Sphæria morbosa*, and when its various kinds of spores were found, they were recognized as belonging to it and called by its name. But the different forms of black rot were at first supposed to be distinct species and they received different names. The black wheat rust was called *Puccinia graminis* in 1797. A little later the red rust was named *Uredo linearis*, being considered a distinct species; but several years earlier than either of these, the cluster-cup form on the barberry was called *Aecidium Berberidis*. When the red and the black rots were found to be of the same species, there was no difficulty about the name, because the older of the two names was the one that had been given to the most highly developed spores, and it is now rightfully applied to both forms; but when the cluster-cup was proved to be a form of the same fungus, the question arose, shall the law of priority be followed and the name be *Puccinia Berberidis*, or shall the original name of the most highly developed stage be retained? The first name must be *Puccinia*, because the fungus belongs in that genus; *Puccinia graminis* is the name still used. One of the other wheat rusts was first studied in its red form and called *Uredo Rubigo-vera*. Afterward its black spores were called *Puccinia striæformis*. When they were found to be forms of the same species, the older specific name was combined with the proper generic name, and the fungus was called *Puccinia Rubigo-vera*; but some claim that it should still be *Puccinia striæformis*.

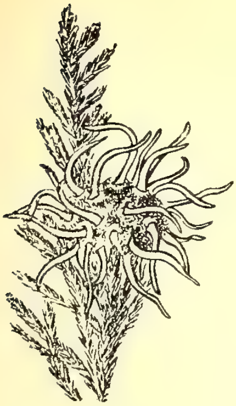
Another question arises here. It is a necessary custom to append to a scientific name the name (often abbreviated) of the man who named the plant. Who is the author of the name *Puccinia Rubigo-vera?* Some botanists claim that it is the man who gave the name *Rubigo-vera*, though he placed it in another genus; others say it is the man who first put together the names *Puccinia* and *Rubigo-vera;* still others hold that both men's names should be appended as authorities, the first in parenthesis, thus: *Puccinia Rubigo-vera* (De Candolle), Winter.

The black rot fungus of the grape has had more than twelve different names, applied to different stages or the same stage growing under different conditions, or by botanists in ignorance of names previously given, or by others who made too much of unimportant differences. The botanist cannot ignore these names; he must take account of every one. If one of the variations is allowed to stand as a supposed distinct species when it is only a form of the rot, it may be ignored in applying remedies, and so remain a source of infection. This was actually the case until recently with the leaf forms of the black rot.

But having once recognized any fungus in all its forms and variations, and having selected the name which ought properly to be retained, the other names need only be recorded in a list of synonyms and laid away. The most highly developed form of this fungus was the last to be discovered, therefore the last to be named, but fortunately all have agreed in retaining the specific name of this form.

If this is all confusion to the reader, will he not feel a little pity for the botanist who is compelled to study names when he wants to study plants?

Harvard University. A. B. SEYMOUR.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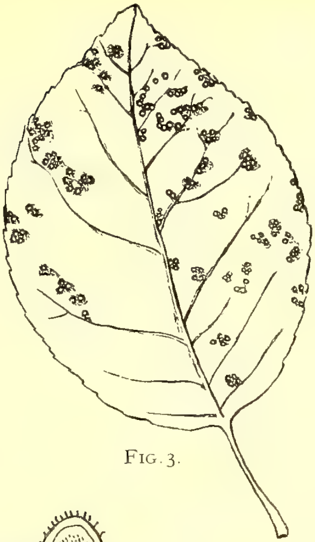
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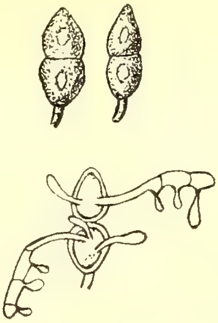
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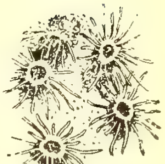
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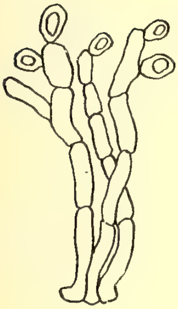
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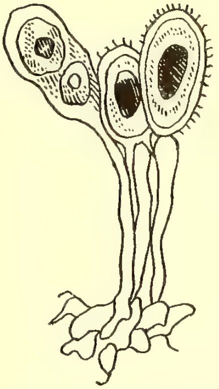
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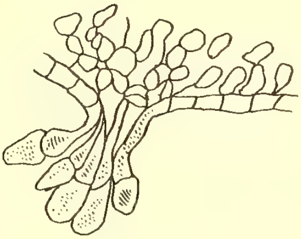
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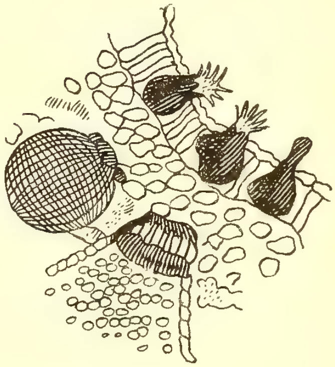
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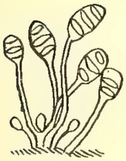
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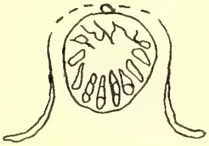
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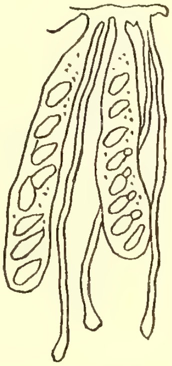
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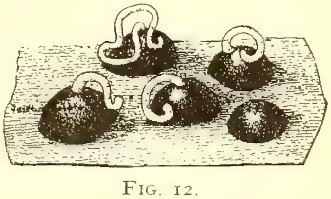
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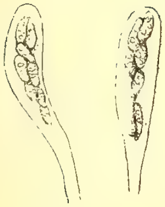
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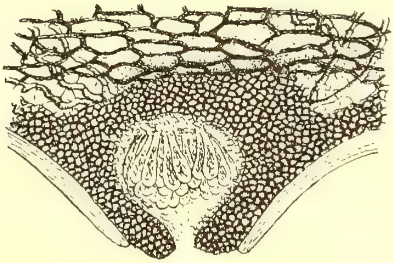
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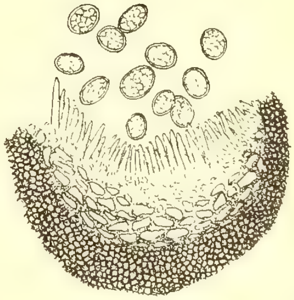
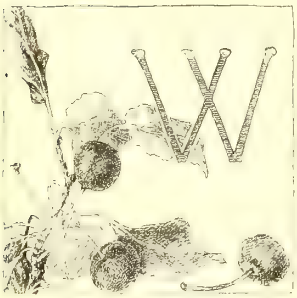


FIG. 13.

A LITTLE PLACE IN THE COUNTRY.

CARE OF LAWNS—WORK AMONG FRUITS—TRANSPLANTING—THE SPRING GARDEN—EARLY PEAS—BOOKS OF GARDENING.

Eighth Paper.



WHILE the winds of March are blowing, the work of the garden can be pursued only tentatively. But if the ground is dry enough to permit of being out-of-doors with our tools, there may be found work to do every day, so that time shall no longer hang heavy on our hands. However well the lawn was cleaned last autumn, it should have fresh attention now. The mold of winter is to be loosened up with the rake and taken away. The debris of broken twigs that have been falling from the trees all winter, all dead branches that were overlooked before; the few scattered leaves that have thus far escaped us; and the green stem of a dock, or plantain, or dandelion that has survived the winter, as such weeds will, must all be cut off, rooted out, and gathered up. Rough places must be smoothed again, poor places enriched again, bare places seeded again, for eternal vigilance is the price of a fine lawn.

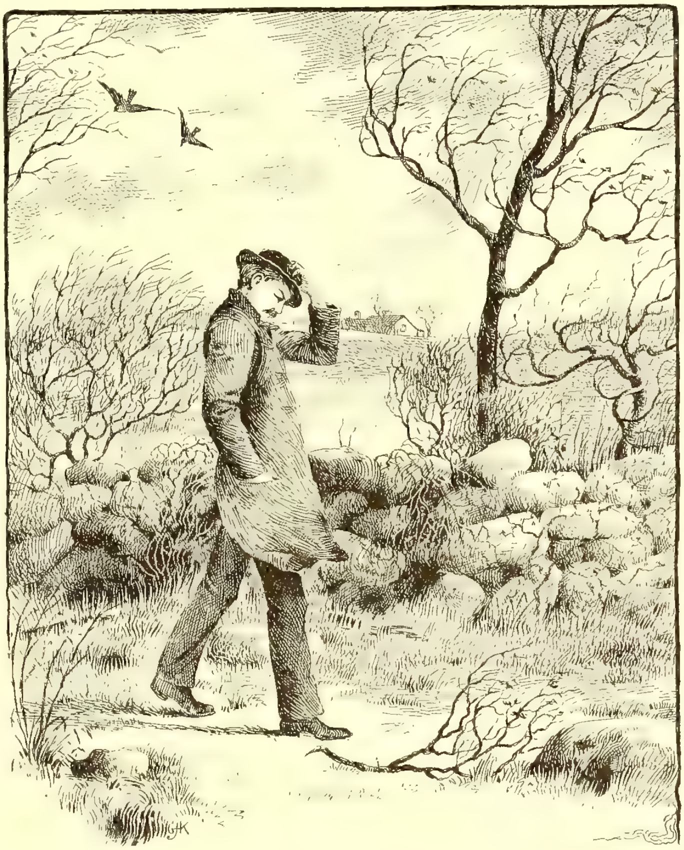
Work the soil about the young trees with a spading-fork, as far out about the trunk as the roots extend. Cultivate in wood ashes, or some other good fertilizer, and then keep the soil loose and clean throughout the season.

We cannot expect as quick returns from our fruit trees as from the garden, but that is no reason, as some seem to think, for neglecting them. The worse the treatment given them, the less care they have in the way of cultivation and fertilizing, the longer they will be in making a return upon the investment. Good treatment is essential in bringing them to early maturity. The strawberry beds should be cultivated by working the soil lightly between the rows, not deep enough nor close enough to the plants to disturb their roots. Then rake the mulch from above the plants and leave it between the rows where it will serve as a summer mulch, keeping the soil moist, preventing the weeds from growing, and, if drawn as close to the plant as it should be, keeping the fruit from contact with the ground. Many favor no cultivation of strawberries in the spring; but aside from all other considerations, unless the ground is extremely clean to start with, it will be very difficult to keep the weeds in proper subjection by relying upon the mulch alone.

By the latter part of the month there will be some plants ready to remove from the hot-beds to the open ground. Even if not quite sure that we are through with freezing weather, a few cabbage and cauliflower plants may be put out, and protected at night with covers, as described in these pages in December last. Both these plants will withstand a good degree of cold, if they have been properly handled in the bed, and so made accustomed to the fresh air. In transplanting, take them up with a trowel in such a way as to retain about the roots a quantity of the rich soil of the bed. Exposure of the roots to cold and drying winds will check the vitality of the plant; and our object must be to keep the conditions as unchanged as possible. If the bed is showered lightly before lifting the plants it will be easier to retain the soil about them. It must not be understood that this method can be pursued on a large scale, as where thousands of plants must be handled in a day, as is the case with market-gardeners. There the plants are pulled up by hand, placed in bunches, and distributed along the rows by boys, who are followed by other hands who set them in. But this first season we will take a little extra pains with every operation, so that we may not reap any of the fruit of failure, grown from the seeds of carelessness. For this early planting, and for some weeks to come, there will be sufficient moisture in the soil to answer all the needs of the young plants. Later in the season, when putting out late cabbage and celery, we shall probably need to avail ourselves of our water privileges. If the ground upon which these plants are put is not already superlatively rich, it will be better to fertilize in the hill, rather than to spread manure broadcast. A wheel-barrow or hand-cart load of fine manure will suffice for a good many hills. A small shovel full should be thrown down at points two feet apart each way, and worked into the soil with the fork or hoe.

Thus the soil close about the roots, and from which the plant must draw its first sustenance, will contain an amount of plant food which it would be almost impossible to put within its reach by broadcast fertilizing.

Although cabbage may be a very common and plebeian vegetable, hardly to be named in the same garden that is to produce the more aristocratic cauliflower and the crisp celery, it is an item nevertheless which we will tolerate this season for the profit which it may afford. It may be true that every garden about us will contain cabbage, and trust everyone can grow it. But not everyone can manage to have it very early, to have good-sized, solid heads, and to have a proper succession. If we can accomplish this, and grow in all a couple of thousand heads of early and summer sorts, we shall have an item of steady income for a couple of months, and we may have the ground upon which it is grown cleared in plenty of time to be used for celery. To secure a good crop of cabbage, the cultivation must be thorough and constant. The nearer one approaches to the good old rule of "hoeing the cabbage every morning before breakfast," the nearer they will be to assured success.



Planning the Summer Work.

But it is not upon cabbage that we must rely for showing the first proof that we are good gardeners. Early lettuce and early onions, early radishes and early beets are all good enough in their proper times and places. But it is the early peas, after all, that make the mouth water, and the heart of the gardener glad. To achieve success here, is to my mind almost glory enough for one season. And it is a beautiful crop to handle, from the time of sowing the round, creamy seeds, to the "day in fair May" when we gather the first plump green pods. Here, perhaps more than with any other garden crop, we can get satisfactory evidence that our efforts to promote earliness are being rewarded. To secure this desideratum my method is as follows:

I select a piece of mellow land lying level, or sloping gently to the south, and as soon as it is dry enough to permit I prepare this with the spading fork and the rake, until it can be refined no further. Through this I open furrows with the garden plow, making them two feet apart (for economy of space must be observed when we work land by hand-power instead of horse-power); then scatter in the furrows some of the same fertilizer that was used for the cabbage hills, and mix with the soil by running the plow through the furrow again. Into this furrow I *scatter* the seed, not dropping them in a single straight line, but in a row perhaps three inches wide, and so thickly that there are probably 50 seeds to each foot of the row. They are then covered by running the plow alongside the row and throwing the furrow over on them. But before planting the seed, there is an important item of preparation that must not be omitted. Twenty-four hours previous to sowing, I mix the seed with rich, fine soil, in about equal portions, and keep the mass damp and warm until ready to use. In that time the hard epidermis will become softened and usually broken, and often a tiny sprout will be put forth. They are then ready, when put in the ground, to avail themselves of every advantage that nature offers for their sustenance and growth.

If purchasers are not found for the surplus hot-bed plants as rapidly as desired, procure some small boxes from the grocery, put in them about three inches of good soil, draw the plants from the beds and put them in the boxes, and leave for sale at the best grocery store in the place. Put the plants close together in rows containing fifty or a hundred each. Cover the roots well with the soil, and lay a small twig between the rows so they may be counted out easily. If kept out of the sun and wind, and moistened each morning, the plants may be kept in good condition for several days. It is a mistake to leave the plants in the beds too long; as soon as a plant is large enough to handle it is large enough to transplant.

Now that we have fairly entered upon the season's work in the garden, the beginner will have a thousand questions to ask. Every day some new problem will confront him, many of which in the nature of things he must work out for himself, and wait with what patience he may until the progress of the season writes his answer in success or failure. Many of the questions may be answered in some single horticultural work, or within a single series of papers, but not all of them. The questions that arise are too diverse to be met within so limited a compass. The library of our little place should be stocked—not with a single work on gardening—but with as complete a reference library concerning the art horticultural as our means will warrant purchasing. Particularly should there be treatises by the best authorities upon especial subjects, such as the arts of pruning and grafting, the values and uses of fertilizers, the chemistry of agriculture, the culture of small fruits, of especial money crops, etc., etc. To these should be added, or rather the first place should be given to, the best current periodicals. These should not be for effect, nor to ornament the shelves of the library, but should be consulted in every operation until we have become so familiar with every process that theory and practice are wholly reconciled. Thus utilized, every book and magazine will amply repay the investment made in them.

If to the above is added a practical work on botany, and we make use of it to identify the plants and weeds and grasses that we find every day in our strolls and work about our country home, we may gain from its study both pleasure and profit. If we are able to identify the weeds upon the lawn it may help us in rooting out something that may become specially obnoxious if passed by in ignorance. To know the flowers and shrubs, to name and class them, does not show pedantry, but a healthful interest in nature and her works, which, if we do not possess, loses us something of that very flavor that we came hither to seek. In the city it may be that the proper study of mankind is man. But in the country our proper study is nature and her works, and this we should pursue diligently to the end that we may become better custodians of the treasures which she will pour upon our little plot of earth.

SOME NORTHERN FRUITS.

NOTES FROM THE ISLANDS OF LAKE CHAMPLAIN.

Tobias Seedling Apples. When white men first settled Grand Isle they planted fruit-seeds, especially those of the apple, and the fruit of the trees so raised was of course of varying quality. A few proved to be very valuable in regard to hardiness of tree, productiveness, flavor and keeping quality, particularly some raised by Mr. James Tobias, one of the pioneers.

The first of these I will mention is the Tobias Black. The tree is very hardy with a large spreading top, and very productive. The fruit is large to very large, dark dull purplish-red with many dots all over it, flattish and often uneven, calyx and stem rather deeply set. Skin thick and tough; stem small, a little over one-half inch long. The flesh is solid and brittle and when mellow is tender, retaining its brittleness; it is yellowish in color and juicy, with a very mild sub-acid flavor. A good apple for any purpose. Season from December to May.

The next of the Tobias seedlings is the Tobias apple. The tree is hardy, with spreading top, and is productive. The fruit is large, heart-shaped, a little corrugated, especially around the calyx, which is closed in a cavity of medium depth; stem rather deeply set, slender, about one inch long. Skin yellow, dotted all over, slightly reddened on the sunny side near the stem. Flesh yellowish, firm, not crisp, with a peculiar aromatic odor and flavor which is very pleasing; mild sub-acid. A very good apple for the dessert. Season December to January.

Tobias Gage Plum. On the farm of James Tobias there originated more than fifty years ago a plum that is evidently a seedling of the Green Gage. In the growth of the tree, size, shape, color and season of the fruit it is identical with the Green Gage, but the tree is hardier and, without exception, all who have tested both sorts agree that this seedling, which for present convenience I shall call Tobias Gage, is considerably the better plum. One defect of the Green Gage is that it cracks during wet weather. The Tobias Gage never cracks in any weather except an occasional fruit from over-ripeness. Most plums are at their best when mellow, but the Tobias Gage when fully ripe, and just before it is mellow, is as crisp as any apple, very juicy and more sprightly in flavor than when mellow. That it is a seedling here is evident from the fact that it has always been propagated from suckers.

Speckled Gage. James Tobias, son of the pioneer, many years ago got some grafted plum trees from Montreal, and a sprout from one of them bore plums that from their appearance were named Speckled Gage. The tree is small with slender twigs, is very hardy and very productive. The fruit is small, round with a slight suture, reddish purple and speckled all over with small dots. It is liable to crack when over-ripe, and then the flavor near the skin is exceedingly sweet and sugary, but near the pit, to which it clings, it becomes quite acid. This plum is more highly valued for cooking and canning than any other plum grown here.

Golden Gage. This plum originated here on the farm of my father, Benjamin Macomber, and is a seedling of Coe's Golden Drop. The tree is small and very hardy, so much so that it will bear fruit when the fruit-buds of all other European sorts are killed. The tree is liable to over-bear. The fruit is medium, oval, yellow with a crimson cheek. This plum has no "neck" like its parent, being very even in outline. Flavor rich, sweet and delicious. Two weeks earlier than its parent.

Macomber Pears. These are all chance seedlings on my father's farm, being trees that were left unbudded in the nursery rows, except Grand Isle, which came up in the garden and has never been transplanted. This Grand Isle was outlined and described by Charles Downing in one of his supplements to "Fruits and Fruit Trees of America." This and all others of these pears have been figured and described in the *Rural New-Yorker*, and I need say but little about them here. All the trees are very hardy, and are productive in alternate years. Grand Isle is pyriform, medium size, slightly acid, does not rot at the core, but is dry and insipid if mellowed on the tree. Season, September.

The Refreshing is the most closely upright grower of any pear I have ever seen. At a distance it might be mistaken for a small Lombardy poplar. The fruit is shaped very much like the Sheldon. It is yellow, sweet, juicy and rich. Good mellowed on the tree.

The Little Gem tree is rather tall, pyramidal in growth, very productive of small, yellow fruit, of pyriform shape and true Bartlett flavor. Ripe the middle of September. the same as Refreshing.

Dr. Hoskins Pear has been called a seedling of Flemish Beauty because it resembles that sort. But its parentage is not known. It is the largest of our seedlings, and by a careless observer would be called a Flemish Beauty, but it is broader at the stem and has more of a neck. It is about as large as Flemish Beauty, ripens with it and differs from it in flavor, mainly in being a little inferior, but is not subject to that sort of fungus that is so destructive to the fruit of the Flemish Beauty.

All the above seedlings came into bearing about twenty-five years ago.

The Vermont Beauty was described in the *Rural New-Yorker* under the name of Macomber, but the introducers, W. P. Rupert & Son, of Seneca, N. Y., have given it the above name. It was the last to come into bearing, about five years ago, and deserves more than a passing notice. The tree is yet small, of low pyramidal growth with slender twigs and is a good bearer in alternate years. The fruit is small, a little larger than the Seckel. It is pyriform in shape and as even as if turned in a lathe; no basin at the calyx, slightly indented at the stem. But the color! This is one of the fruits that the lover of the beautiful will delight to see. It is bright yellow, with a clear, brilliant, crimson cheek rivalling in beauty the most beautiful crab apples. It is very juicy, with a mild sub-acid, sprightly flavor. It is so solid that it could be safely sent across the continent in the mail with no more than ordinary packing.

[NOTE.—The Vermont Beauty was favorably mentioned at the recent meeting at the Western New York Horticultural Society.—ED. AM. G.]

The Landon Apple originated a few years ago on the farm of the late Buel Landon, of South Hero, Vt., one of the towns on the island of Grand Isle. The tree is a rather slow, upright grower, very hardy, but a rather shy bearer. The fruit is above medium size, slightly flattened, purplish-red, obscurely streaked and specked all over with dots that are slightly indented. Calyx open, in a shallow basin. Stem short, rather deeply set, Flesh firm, crisp and juicy, with a mild sub-acid flavor which is of the best. Would bring a high price in a market where known. Season December to May.

Dewberry. The Lucretia dewberry has been spoken against by some, but I think it is the most valuable blackberry to plant at the north. It may not be so hardy as some of the bush sorts, but its natural position on the ground makes it one of the easiest of plants to cover. A few evergreen boughs I find to be sufficient. Some complain that the fruit gets covered with dirt during rains, but it is not necessary that it should become dirty. I make a horizontal trellis about two feet from the ground upon which I lay the canes in the spring. This puts them in the best position to be protected from birds by mosquito netting.

Champlain Raspberry. This berry is a chance seedling in my father's garden, and is believed to be from White Antwerp. The canes are very much like the White Antwerp. The berry is as large, lighter in color and more freely produced, ripening at the same time. The seeds are a third smaller, while the drupes are fully as large and filled with a little pulp and a good deal of juice. It is the most melting raspberry I know and at the same time the best; I doubt if any other raspberry can equal it in its high, delicious flavor. It is too soft for the general market, but a superior sort for the family.

Grand Isle County, Vt. J. T. MACOMBER.

THE COCOANUT AT LAKE WORTH.

It may not be generally known to the reader of The American Garden that the cocoanut is growing and bearing abundantly in the United States. It is true that the area of its successful culture is very small, as it comprises only a small strip along the coast of Florida, beginning near Jupiter Inlet on the east, and running continuously around the coast, including the adjacent islands or keys, to an unknown point on the west coast between Key West and Charlotte Harbor. The experiments are yet too few and insufficiently made to definitely determine just how far north the cocoanut may be grown on the Gulf side of the Florida peninsula, but on the east coast I think this matter has been fully determined. Near Jupiter Light-house is a tree that has been bearing for a number of years, which was not damaged by the great freeze of 1886. North of there the trees are quite young, but from personal observations made last winter, I conclude that it is not at all likely that the cocoanut trees will ever be brought to a fruiting period much north of Eden, which is situated on the Indian River about 40 miles north of Jupiter Inlet.

If the reader will take the pains to examine a good map of Florida, he will notice that the eastern coast runs nearly parallel with the Gulf Stream about as far north as a point opposite the southern end of Lake Okeechobee; from this point the coast changes from a north-easterly to a north-westerly direction and recedes from the Gulf Stream. The warm waters of this great current have a material influence on the climate of the shores which it washes, as we well know, hence the tropical character of the coast lying south of Jupiter Inlet. Not only does the cocoanut succeed there, but many other tropical growths that are sensitive to the very slightest frosts are found growing there luxuriantly, and even north of there. Lake Worth is really a narrow sound about thirty miles long, averaging less than a mile in width. It is subject to slight tidal changes, as it is connected by an inlet with the ocean. The strip of land lying between the lake and the ocean is a most lovely place for residences, and some wealthy people have availed themselves of the location for their winter homes. Tomatoes, beans and other vegetables are grown for northern shipment in winter. There are large cocoanut trees now thirty years old on this strip, about 40 feet high, which have been bearing since they were five or six years old. They have never been damaged by cold, although there have been several slight frosts there since they were planted. There are fully 50,000 cocoanut trees, old and young, now growing on the shores of this little body of water, many of them having begun to bear in the fifth year from planting the nut; and in nearly all cases they have shown signs of fruiting by the seventh year. Sometimes the nuts hang within two feet of the ground, as I have had abundant opportunity to observe. There can be nothing more picturesque and graceful than the soft, yellowish-green leaves of the cocoanut groves as they wave in the wind, which blows almost constantly along these shores. Many of the leaves are from 10 to 20 feet long, and as perfect in every particular as an ostrich plume. There is no special season for the fruiting of the cocoanut as the same tree has flowers and ripe fruit continuously. As the crown keeps growing, the flower shoots keep coming, and beneath them hang great clusters of fruit in all stages of growth, and fully ripened nuts; and almost any day nuts freshly dropped may be found upon the ground. It is supposed that a tree in full bearing will produce an average of one nut a day, but I think this is a little more than they actually bear at Lake Worth, although I have counted more than 300 nuts on one tree. A cluster was sent to my office from Palm Beach (which is a beautiful little place on this strip of land), that had 31 nuts nearly full-grown, besides a few that had become detached in transit. I should think the cluster weighed more than 150 pounds, and at maturity, I suppose it would have weighed more than 200 pounds.

The nut as it appears in market is stripped of its outer husk or covering of bast, which is about two inches thick, making the nut as it falls from the tree, about ten inches long and eight inches in diameter, and about the shape of a grain of buckwheat,

It may be that from a commercial point of view, the culture of the cocoanut may not prove a success in the United States, as growers will have to compete with the products of the tropics where the cocoanut grows almost without care, and of course it is produced very cheaply, but as a of matter of interest and beauty, it is already a delightful success.

It will repay any one who has the time and means at command, to take a trip along the east coast of Florida to Titusville by rail, thence on one of the comfortable Indian River steamboats to Jupiter, and a short eight-mile trip by rail from there will land him on the picturesque and tropical shores of Lake Worth. I do not think a more interesting trip for the botanist, the fisherman, or the lover of beautiful scenery of the Egyptian type, can be found in North America.

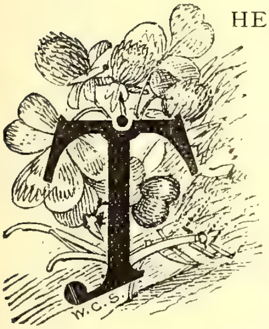
H. E. VanDieman.

U. S. Dept. of Agriculture.

SEEDS AND SEED GROWING.

Fifth Paper.

THE ORIGIN OF SOME VEGETABLE FORMS.



THE HISTORY of most garden vegetables is obscure. In the oldest writings nearly every vegetable form is noted, and so far as we can learn they were as successfully grown as at the present day. Asparagus is mentioned by Cato 200 years B. C., and Pliny mentioned a sort that grows in his garden at Ravenna, of which three heads would weigh a pound. The Emperor Tiberius had melons on his table every day in the year, and cucumbers, beans and leeks are frequently mentioned in the most ancient writngs. In fact many authorities agree in saying that the origin of garden vegetables is largely unknown. While but little is known of the origin of the different forms, and whether what we term wild plants are degenerate forms or whether our cultivated forms are regenerate forms, are still questions awaiting answers. Certain it is that varieties are constantly changing; many forms we knew fifty years ago have passed away and others have taken their places. The influences that bring about these changes are what we wish to consider, as it is upon these that future development depends.

When the earth was first clothed with plants, nature fitted each for the position it was to occupy. While the principle that governs all is the same, the mission that each has to fill is entirely separate and distinct; no two are alike, and no two derive the same elements from soil and atmosphere. Consequently when a plant was removed from its native habitat into new fields and among new elements, it had from necessity to undergo a change in order to adapt itself to the conditions in which it was placed, and that in most instances for self-preservation. A marked illustration of this may be seen in the Horse chestnut (*Æsculus Hippocastanum*) a native of Asia, where the climate is much milder than our own. Its buds are covered thickly with a gummy substance, which protects the tender interior from cold and wet. As the sun gains power, the gummy covering melts and yields to the expanding pressure from within, and then the scales on which it is overlaid fall off, and the delicate green leaves are rapidly unfolded. This tree will endure the rigors of a New England winter, where the temperature is at least 50 degrees colder in winter than in its native home. But nature comes to the rescue; the farther north the tree is taken the heavier is the coating of wax or gum that protects the bud.

All vegetable forms change or adapt themselves to the climate in which they are placed. The variation of plants through climatic influences is more marked than is generally supposed. In fact, climatic influences have more to do in changing the character of vegetable forms and properties than all other causes combined. No more striking instances of this can be noted than was shown in the production of the Belgian carrot. This affords a most valuable and conclusive illustration, as it is one of the few recorded instances where, by systematic effort, a wild plant, entirely worthless, has been so improved by cultivation and selection that a noxious weed has developed into a vegetable, valuable either as a garden or field crop. The Belgian carrot is derived from *Daucus carota*, the wild carrot, which has small dry sticklike roots of exceedingly high flavor. The history of its transformation is interesting and valuable, because the knowledge may assist in the development of other forms. Several investigators have endeavored to improve the wild carrot. Prominent among the many enthusiasts in this branch of study was M. Pousard, a French scientist, who had been successful in improving the wild parsnip, but he utterly failed in his effort to ennoble the wild carrot. Decaisne, after repeated trials with it, gave up in despair, and came to the conclusion that the cultivated forms were especially created for the use of man. M. Vilmorin, the well-known French seedsman, undertook a series of experiments in the development of the wild carrot, the result of which was most satisfactory. He gathered seed from plants which grew by the sea-side and cultivated them far away from saline influences; he succeeded in obtaining perfectly tender edible roots of large size, and perfectly smooth, in four generations—the variety which is to-day known as the White Belgian carrot. While his efforts were perfectly successful from seeds grown by the seaside, under the same treatment and under the same conditions he could not effect any change with seeds gathered from plants which grew inland. As the seed sown in both cases was from the same species, and each treated in precisely the same manner, under the same natural conditions, the only inference to be drawn is, that the marked development was due entirely to climatic influence.

A further illustration of susceptibility is shown in the origin of the Student parsnip. In 1847, Prof. Buckman gathered from the Cotswold hills, England, which are noted for their hard, gravelly, clay loam and generally barren aspect, some seeds of the wild parsnip, which is among the most frequent of weeds. This seed was sown at a great distance from where they grew, in the usual manner, in the spring of 1848. As the plants grew they were duly thinned out, leaving for the crop, as far as it could be done, the specimens that had leaves with the broadest divisions, lightest color and fewest hairs. The first crop of roots from this wild seed presented great diversities in shape, being for the most part even more marked than the original, but still with a general tendency to fleshiness. Of these the best were reserved for seeding. The seed produced in 1849 was sown in 1850, the crop showing still greater improvement, not only in shape but fleshiness. These experiments were carried on from year to year until 1859, when the variety had become so perfect in form, clear in outline, delicate in skin, and unexceptionable in flavor, that Prof. Buckman was induced by the Messrs. Sutton, of London, to have it distributed, and they named it "Student." It is claimed, and we think justly, that this variety is more constant, or less liable to deteriorate, under favorable circumstances, or under ordinary cultivation, than any other variety.

We have noted these instances to show what can be accomplished by persistent systematic efforts; also to show the importance of selecting such varieties as are best adapted to the positions they are to occupy. It is folly to attempt the growing of everything in a given locality. Some things will do well, others not, experiment alone will prove that which is best. Having found it develop to the utmost its capabilities.

Long Island. C. L. Allen.

THREE HARDY CHERRIES.

We commenced sending out for trial in 1884 three varieties of the cherry well known in Western Europe, but originally introduced from South-central Asia, viz: Shadow Amarelle, Spate Amarelle, and Large Long Late.

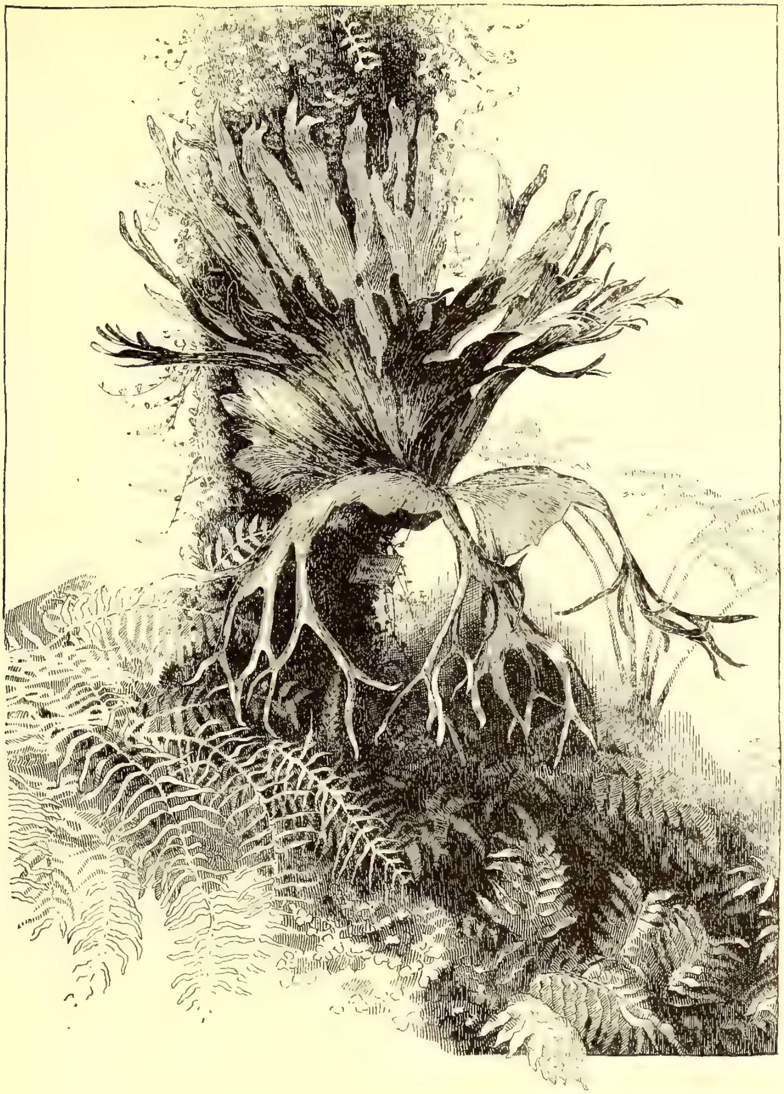
We are now receiving reports from various sources east and west that the trees are doing well and coming into bearing very young, but the complaint is made that the fruit is only valuable for culinary use on account of the bitter flavor.

With a view to forming correct impression of these varieties, which are very much alike in tree and fruit, I will give the estimate of M. Lauche, of Berlin, of Spate Amarelle. In his Deutsche Pomologie he says: "Fruit medium, often large, roundish, slightly flattened above and below, with a slight suture; skin bright-red, and when fully ripe dark blood red, often with whitish-gray dots; transparent. Flesh and juice red, flavor pleasantly acid. The bitter of the partially ripe fruit wholly disappears when it is fully ripened. It is excellent alike for table and culinary uses. The tree grows to medium size, is very durable, and remarkably fruitful. On espaliers the fruit attains remarkable size and beauty." So far as yet tested, the fruit seems to be valuable for canning if picked when red and slightly bitter. In cooking the bitter entirely disappears, and all who have tasted the sauce agree that it has more body, more grape sugar, and better flavors, than that of any cherries known to them, not excepting Californian fruit.

When perfectly ripe the Shadow Amarelle is the best of the three for dessert use, and the Large Long Late is the poorest, for the reason that it has most acid.

These varieties will prove specially valuable in localities where the Richmond fails in tree or in fruit crops on account of winter injury of fruit buds or injury of blossoms by spring frosts. In the spring of 1888 these varieties set full crops of fruit in Iowa when every variety of the old list was cut off by spring frosts. In more favored sections, where the sweet cherries do fairly well, these European sorts will also be favorably regarded both for dessert and culinary uses, as they contain fully twenty per cent. more grape sugar than the Richmond or Late Kentish, and the sauce is colored as handsomely as that of the cranberry.

Ames, Iowa. J. L. Budd.



THE STAG HORN FERNS.

This small genus of about a half a dozen species is one of the most extraordinary among plants that are cultivated for the attractions of their foliage alone. They have been called the grandest among ferns. They are distinct epiphytal ferns or those that grow upon trees, and, as may be expected, best develop their beauties when their natural conditions are successfully imitated. They are usually classed among what gardeners call stove ferns, from the heat and treatment they require. They are readily distinguished by their two regularly branching fertile fronds. They thrive in baskets or shallow pans, or when fastened on good-sized blocks of wood, with a little peat and spagnum around their roots and suspended in a warm greenhouse; but they never appear to such advantage as when attached to the trunk of a tree or wall of a conservatory surrounded by vines and other plants. The popularity of ferns is ever increasing, and ideas concerning their culture and the amount of heat necessary have of late been considerably modified, many being found to do even better in places once considered too cool to be suitable. Although all ferns from the tropics require more or less heat, the idea that they require great heat at all times with heavy shading is altogether a mistake. Although ferns delight essentially in shade and moisture, both may be carried to excess. They should grow and rest as well as flowering plants. We know of stag's-horn ferns doing perfectly well during their resting period, which should be winter, in a conservatory connection with a house where a temperature of only 50° or 60° was maintained, and where they were readily seen by all who cared to enjoy them. A drier atmosphere can also be maintained. When growth commences a higher temperature and more water will suit them. Our picture is from a specimen in Philadelphia, and shows the large barren fronds erect, and the fertile ones pendent in pairs. These sometimes is vigorous plants reach a length of six feet. Although the sort (*Platycerium grande*) was introduced into cultivation from North Australia in 1828, it is by no means familiar.

JESSAMINES.

A "JESSAMINE" may be almost any flower in existence, especially as applied by some people, if it be sweet-scented. In literature it has become almost as popular and as general a term as "myrtle" and "ivy." Nobody knows what a literary "ivy" may be, whether an ampelopsis, a hedera or a linaria. It is supposed to combine all such desirable qualities as constancy, beauty, grace and delicate tenderness, and in the meanwhile to keep up a vigorous clinging to the "sturdy oak." The literary term "myrtle" may apply to a variety of plants equally at home in a cemetery or on the poet's brow, and it has come to be that wherever there is a cottage containing a pretty girl that somebody is in love with, there a "jessamine" is placed. Even the florists' catalogues, which should be public instructors, in many cases hopelessly muddle jessamines, gardenias, cestrums and other plants. First, there are the gardenias, popularly known as "Cape jessamines," though the name is a misnomer, the common species, *G. florida*, having been introduced, it is said, from China in 1754, and named in honor of Dr. Alexander Garden, of Charleston, S. C. This species is well known everywhere. At the South it has been popular for years, as it is perfectly hardy throughout the lower Southern States; at the North, though long cultivated, it has suddenly become popular on account of the whims of metropolitan florists. Its popularity, however, is for once well deserved. Other species of gardenia are not so well known, though *G. radicans* is sometimes seen. Other fine species and varieties are *G. Thunbergii*, *G. lucida*, *G. citriodora*, *G. camelliflora*, etc. *Randia floribunda* is a closely related Indian plant, which is said to be well worthy of cultivation. It succeeds well in the open ground in South Florida.

The cestrums and a kindred genus, habrothamnus, are also often confounded with the jessamines. *Cestrum nocturnum* is the most common sort, and is usually known as "night-blooming jessamine." It is a coarse, quick-growing shrub, but when in bloom it exhales a most delightful fragrance in the night. The flowers are produced in the greatest profusion, and the shrub quickly attains a height of fifteen or more feet in the open ground in Florida or the West Indies. *C. Parqui* is also quite well known. *C. laurifolium* is a beautiful West Indian species which opens in the day-time. The delicate white flowers are very fragrant, and almost equal to heliotrope for some sorts of cut-flower work. The species of habrothamnus are quite numerous and well known in greenhouses, but they are not so often bundled in with the jessamines. *Gelsemium sempervirens*, the so-called "Carolina yellow jessamine," is a plant worthy of especial attention. It is found in every hammock and on every rail-fence from the Carolinas to South Florida, and a more beautiful and delicate climber does not exist. Evergreen, with glossy, shining, dark-green foliage, and in February and March covering every branch of myrica and persea and gordonia, and clumps of palmetto, with sprays and wreaths of the sweetest golden-yellow bells, often breaking into perfect sheets of color. The gelsemium should be seen in its native hammocks to be appreciated. I have no doubt, however, that it could be forced under glass at almost any time. A double-flowered variety, first introduced by P. J. Berckmans, is worthy of a place in any collection of plants.

Closely related to the true jessamines is *Nyctanthes arbor-tristis*, the "Tree of Sadness." This plant is a great favorite in the gardens of India, of which country it is a native. The beautiful, small white flowers, faintly tinged with orange, are open only through the night and early morning, but the perfume is so exquisite that the tree has been recommended as of value for scent distillation. The shrub is perfectly at home in South Florida, and commences to flower the second summer from the seed or cutting.

Many sorts of the true jessamines (jasminum) are universal favorites. Perhaps the most common is *Jasminum grandiflorum*, known as the "Catalonian" jessamine or "Star" jessamine (though the "stars" in the jessamine family are as plentiful as the "Johns" in the Smith household). The plant is half shrubby, half climbing, and is almost always covered with its fragrant pinkish-white flowers. Another favorite is the "Arabian" jessamine (*Jasminum Sambac*). This is a climbing species with simple leaves (the leaves of the "Catalonian" and of most other species are compound), and single, semi-double or double white flowers, very fragrant, as are those of all the species of the genus. This species and the preceding will stand but a very light frost unharmed. The variety Grand Duke of Tuscany seems to belong, botanically, to this species of the genus jasminum, It is, however, not a climber, but of low, shrubby growth, and produces very double flowers, often to the extent of deformity, which are perhaps more fragrant than those of any other of the species or variety. They are larger, too, than those of the common varieties of the Arabian jessamine.

Jasminum multiflorum has formally been pronounced by a leading Florida nurseryman "the finest flowering plant for South Florida," and it is a beautiful plant, but hardly equal, I think, to the newer *Jasminum gracillimum*, which, well grown in the open ground in Florida in late summer and fall is a "sight never to be forgotten." The great sprays of white flowers and delicate green leaves are only fit for "bridal wreaths," which indeed they are, without artificial arrangement.

But there are said to be 60 or more species of the genus jasminum, and some of them are hardy even in the Northern States. The flowers are usually white or yellow, and I can only mention the names of other better known species, such as *J. officinale*, *odoratissimum*, *paniculatum*, *angustifolium*, *nervosum*, *floribundum*, *hirsutum*, *humile*, *noctiflorum*, *fruticans*, *nudiflorum*, *revolutum*. Many of these are highly prized and largely grown for their perfume along the Mediterranean.

I have known, in Tampa and elsewhere, the unique little plant, *Triphasia trifoliata* (allied to the citrus), to be called "Orange Jessamine," and in Key West the great bare-stemmed bouquet-laden "frangipanni" (plumieria) are called "Coffee Jessamines," for no better reason that I can see than that they do not in the least resemble either coffee plants or jessamines. They will probably be known, however, under that name until *Ampelopsis quinquefolia* shall be no longer known as an "ivy" in parts of the United States, or until some of our leading florists quit selling the weak-kneed little *Linaria cymbalaria* under such a misnomer as "Kenilworth Ivy."

P. W. REASONER.

Manatee, Fla., Dec. 2, 1887.

COLORADO HORTICULTURISTS.

At the Colorado State Horticultural and Forestry Association's recent annual meeting the prevailing life and enthusiasm afforded convincing evidence that in this almost rainless region horticulture has not only an existence but a firm foothold. Scarcely twenty years ago the first fruit trees were planted in the State. With the organization of the State society ten years ago, orchard planting received a fresh impetus, and from that time the yearly setting of fruit trees has steadily increased. The climate is so diversified that a great variety of fruits can be successfully grown. Apples, pears, plums, grapes and the small fruits yield bountifully in the northern counties ; while in the south we may add peaches, nectarines, apricots and the more tender grapes.

Naturally, irrigation and water supply received the attention its importance demands. It is a subject that seems always new. That the problems in the use of water for the growing of horticultural products are being successfully mastered is abundantly proved by the reported yields for the year 1889. Crops were abundant and prices good. Judge Felton, of Fremont county, reported receipts from his fruit farm at $6,023 with an outlay of about $2,400. The greater portion of his receipts were from apples, borne on trees that were set in 1881. Mr. Willmore, of Wheat Ridge, reported receipts from two acres of strawberries, $1,200. The varieties grown were Captain Jack, Jucunda, Manchester, and Jersey Queen. Numerous other reports were made, all of which pointed to a general feeling of satisfaction over yields and prices.

Insects and insecticides received a due share of attention. Most of the insect pests are of recent introduction, but profiting by the experiences as reported from the States where they are successfully combatted, fruit men are ready to meet them. Spraying with Paris green for the codlin moth is in great favor, and is successfully practiced.

"The ornamentation of school grounds," and "Horticulture and Entomology in the schools" are two topics in which the members showed a lively interest, and I venture the prediction that the society as a body will wield an influence productive of good in this direction

Fort Collins, Colorado. C. S. CRANDALL.

HORTICULTURE AT CORNELL.

The visitor to Cornell finds a great and growing general university, in which horticulture has a name and a place. The grounds of the horticultural department occupy about thirty acres of the University farm. The most of this area has a slightly western or southern exposure, but, taken as a whole, it is very uneven and lies in nearly all directions. The character of the soil also varies widely. Some portions are heavy tenacious clay, while others are sandy or gravelly.

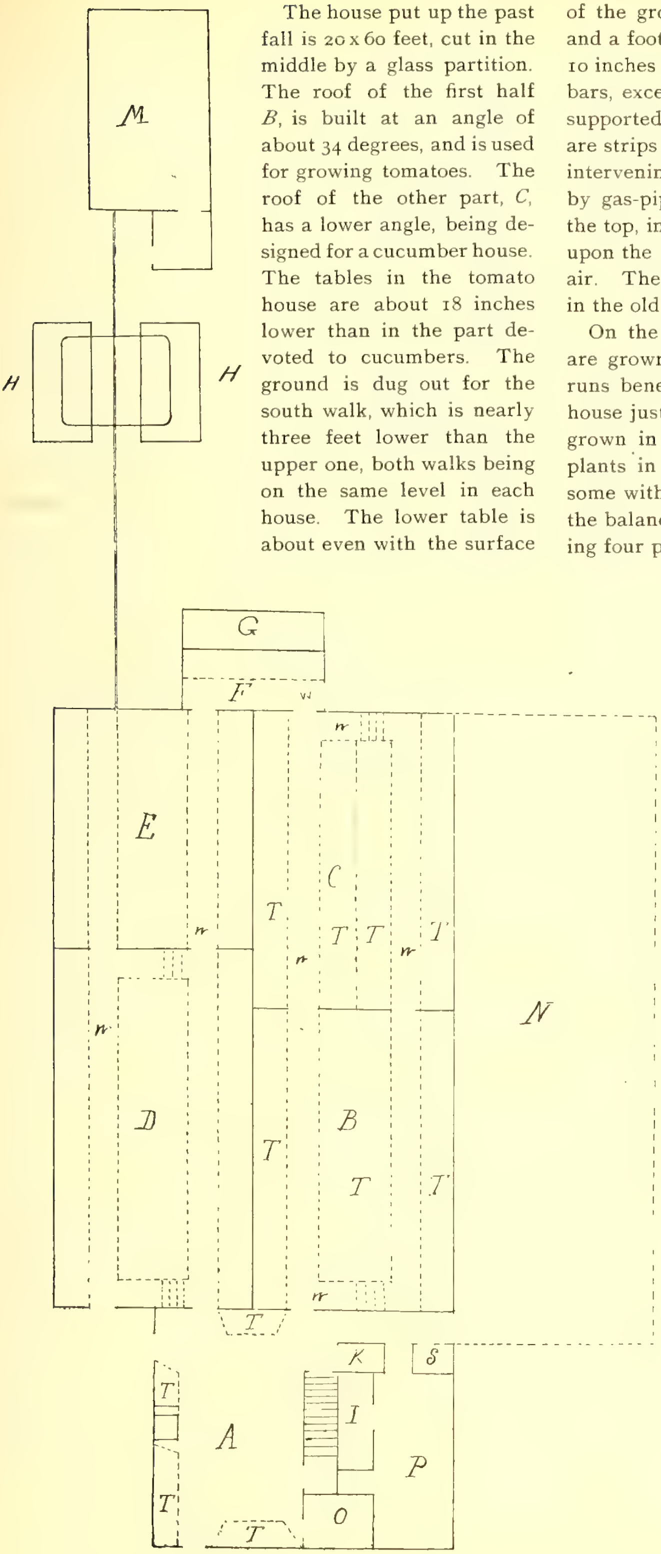
A considerable portion near the forcing-houses, and adjoining the residence of the professor of horticulture, is set aside as a sort of show ground in the matter of experimental work, where things of special interest can be grown. Here we find a row of the different species of our native wild grapes, about twenty in number. Only three of these sorts have been improved, while nearly all our present varieties come from the *Vitis Labrusca*. The possibilities of the others are unknown, and it is the intention to make some advancement in this direction, as well as making something of a specialty of crossing and growing seedling fruits in general. The most important line of experimental work is believed to lie in the introduction and production of new varieties. Foreign and curious vegetables in great variety are grown upon this interesting plot of ground.

Near at hand is the small fruit plot, which is well under way. It should be remembered that this department has been established but one year and cannot make the showing which it will when a few years older. On the east and west sides of the plot is a double row of apple trees, while at the north is the cherry orchard. Still back of these, along part of the north and west sides, is a heavy row of native plums of the Wild Goose type. When these trees are grown, they will make a somewhat sheltered spot for the small fruits. Such protection is much needed, for the station is located on high ground, fully exposed to severe sweeping winds. Just beyond the cherry orchard, on a steep bank facing north, is the vineyard of some fifty varieties, with mulberries interspersed in true Old World style. Below this, on a comparatively level piece of land, which is the most sheltered spot on the grounds, are the strawberries.

To the south-east of the forcing houses, on clay loam, with general western exposure, is the orchard of plums, standard pears and apricots. This orchard will be a matter of much interest as time goes on, for it is to be run on a commercial fertilizer basis exclusively. No stable manure has ever been put on the land, and it is the intention that none shall ever be used there. A dwarf pear orchard is to be planted near by the coming spring, and this will be treated in the same way. It is evident that there must be a constantly increasing interest in the question of profitable fruit growing without stable manures.

At this season, the forcing-houses are of more interest than anything else. These are somewhat novel in construction, and consist of two runs of houses, each 20 x 60 feet, one end of the runs being covered by a potting house and the other by a transverse glass-house. One of the glass structures was built the past fall, the other something over a year ago. A ground plan is shown in the engraving. The potting house, built across the west end in front of the glass-house, has on the ground floor a workroom, *A;* with potting tables for students, and seed case, an office, *O;* clothes-room, *K;* a well arranged photographic room, *P*, having overhead and side light, and a dark closet *I* for manipulating the plates. Hundreds of photographs of fruits and vegetables are taken during the season, and this makes a very useful addition to the equipments. Overhead is an attic with a workbench and storage room for many of the requisites of greenhouse work.

The boiler-room under this building contains a low-pressure steam boiler, so arranged that it can be used for hot-water heating at any time without change, by simply securing the safety valve to prevent leaking there, and filling the boiler and pipes with water, leaving the supply cock open to allow the water to expand back into the water works. This modern method of hot-water heating is proving far more effective and satisfactory than the old plan of using large cast-iron pipes entirely under the benches. There is some overhead heat and the pipes, being thinner, transmit the heat better. If water is not supplied from a water-works system, or if the pressure is too great to admit of expansion in that direction by leaving the supply cock open, it is necessary to provide an expansion tank. This may be a very simple and cheap affair, however.



The house put up the past fall is 20 x 60 feet, cut in the middle by a glass partition. The roof of the first half *B*, is built at an angle of about 34 degrees, and is used for growing tomatoes. The roof of the other part, *C*, has a lower angle, being designed for a cucumber house. The tables in the tomato house are about 18 inches lower than in the part devoted to cucumbers. The ground is dug out for the south walk, which is nearly three feet lower than the upper one, both walks being on the same level in each house. The lower table is about even with the surface of the ground outside. The middle one is 7 feet wide and a foot above the other, and the one at the north side 10 inches higher. The roof is built with permanent sash bars, except the ventilating sash. Every fifth bar is supported by a strong rafter, and fastened between these are strips of band-iron, with their edges supporting the intervening bars. The rafters themselves are supported by gas-pipe standards. The ventilating sash raise at the top, in order to prevent the wind from blowing in upon the plants and to give a more even movement of air. The size of glass used in this house is 14 x 24 in.; in the old house it is 12 x 16 in.

On the lower bench in the tomato house the plants are grown directly in the soil. One steam-pipe here runs beneath the soil, the other along the side of the house just above it. On the other tables the plants are grown in boxes and pots. Part are grown with four plants in a box 18 inches square and 12 inches deep, some with a single plant in a box 10 inches square, and the balance in 10-inch pots. The large boxes containing four plants promise best and the pots poorest. The plants are trained to strings fastened to the roof, and all side shoots are cut off to confine them to a single stem. They receive an occasional jarring to insure proper pollination. The varieties growing are Lorillard, Ignotum, Dwarf Champion, Potato-leaf, Volunteer, French Upright, Sunrise Yellow and Large Yellow. Some of these varieties are grown purely for experimental purposes. The plants are remarkably vigorous, healthy and clean.

In the cucumber house are several varieties of cucumbers, melons, squashes and beans. Here the middle bench is divided, the north half being about 15 inches higher than the other half, which is only a few inches above the outside one. All the plants are grown directly in the soil. A couple of the American cucumbers are now giving good fruits, while English sorts, planted at the same time, are just beginning to set. A beautiful lot of beans is now (January 31st) furnishing pickings. Sion House and Dwarf Flageolet, six weeks planted, appear to be giving about equal returns.

Across the end, covering the doors of the two houses, is a small glass lean-to, *F*, in use by one of the students at present for some experiments with radishes of different varieties. Alongside of this is a storage pit, *G*, with board roof.

Directly to the east is a pit, *M*, 12 x 20 feet, with covered entrance, used for mushrooms. Steam pipes are carried into this, and are so laid that they can be used for heating two hot-beds, *H H*, each 6 x 12 feet, when desired, as shown in the cut.

The Electric Light Experiment.—The general plan of the old house is the same as the new, though differing in some minor details. The most interesting thing in connection with this at present is the electric light experiment. The house is divided near the middle by a tight board partition, and in one room is a Brush arc-lamp. The complete plant is owned by the horticultural department. A six-horse power engine and Westinghouse dynamo is in the cellar of the potting-house to supply the current. This is kept running all night by a night engineer, with a view to determining whether the light has any influence upon the growth of plants. The lower table is devoted to lettuce, the lower center one to peas of different varieties, the next to salad plants, and the upper one to radishes and carrots in alternating blocks. Care has been taken to have all the conditions as nearly identical as possible in each division, in order to make the list reliable. The tables all run through both rooms. Some machines have been devised for measuring the growth of plants by the hour by means of clockwork.

This is a very important experiment, and entirely new in a practical way. It is of special moment to persons in cities or wherever electric lights are used, and especially to those who have much surface under glass. It is by far the largest experiment of the kind which has ever been carried on, and in fact the only one destined to be of much practical value. Plants usually grow ordinarily at night, and it will be of great interest to note what their behavior is when subjected to light continuously; whether they will grow under the electric light the same as in darkness or change their habit of growth entirely. If they change, during what portion of the day will it be most rapid? Are the properties of electric light and sunlight so similar that the operations of the plant must be uniform throughout the whole twenty-four hours, and if so will the effect be to make growth continuous and accelerated or to retard it? It is to assist in determining these and other points that the contrivances for measuring the growth each hour were gotten up. It is probable that later on trials will be made in the matter of substituting the electric light for sunlight altogether. Is it simply light and heat which plants need, or are there properties essential to growth in the sun's rays which artificial light does not possess?

A considerable portion of the work of growing and caring for the plants in these houses is done by students taking practical work in horticulture. One student is making some extended trials with herbaceous grafting, using many of the different methods of inarching and grafting on such plants as coleus, tomato and potato. Part of his trials are made with grafting wax and part with sphagnum moss as a protecting material. Another is doing some original work in the study of the striking of cuttings by experimenting with many plants, taking off the callus when formed and starting the cutting again, preserving the callus in alcohol.

It is designed to add another house the coming season, as indicated by the cut, *N*, in order to give better opportunity for the work of students without encroaching upon the room of experimentation.

FRED. W. CARD.

Pennsylvania.

METHODS OF MARKETING—IV.

A GROWER'S GREAT SUCCESS—HIS PROPER METHODS—RECAPITULATION.

JOHN DOE, of Blanktown, New Jersey, was left heir to a farm of fifty odd acres of as worn out land as could well be found in the state. Since the days of the revolution, this farm had kept the Does in bread and corn meal, potatoes and pork, home-spun and print, cowhide boots and shoes, and not much else. There was the contribution to the annual donation to the circuit dominie, and an occasional bite to the weary traveller who passed over the desolate road; but beyond these necessities of existence there was hardly a penny.

One fine morning, our friend John awoke and found himself possessor and owner of this farm and the many traditions which were part and parcel of the chattels. The possessorship raised no feeling of exaltation in his breast, for he knew from sad experience how hard it was to force from this barren soil sufficient for a bare subsistence. He had, however, mixed some with the world, and though he had dearly loved his old father whom he had the day before laid in his grave, he felt that his parent had not kept up with the times. He strode over the farm, now sinking half-way to his boot tops in the light sand, and anon making a wide detour around a stagnant pool of water, covering perhaps the best soil on the little farm. He paused before a huge pile of marl which represented the last work he and his father had done together. "Is this the sort of fertilizer my land needs?" he mentally queried. Rapidly his mind went over the years he had spent here, of the tales his father and his grandfather had told of the years of unrequited labor spent on this same farm. He knew that the marl was used simply because it could be obtained cheaper than anything else; but did it supply what was lacking in this soil? Evidently not. He had heard that the component parts of marl were carbonate of lime, silicious sand and clay, and that the quantity of each was variable; the clay portion was certainly welcome, but what if the preponderance were of carbonate of lime or of the sand? Surely there was already sand and to spare on the place! His knowledge of the subject would not permit him to solve the problem, but he resolved that no more marl should go on the farm until he understood its chemical properties well enough to know whether it was doing his land good or harm.

Right about face! turned our friend, upsetting with one bold plunge all the preconceived ideas of his ancestors and of his neighbors and friends. The west had swallowed up the wheat industry, and his land was too light and poor to grow hay; so, to make a long story short, with a superb physique, full of life and ambition, a cool, steady head well filled with common sense, and with some money he had saved from occasional jobs of ice cutting when nothing was to be done on the farm, he launched into fruit and vegetable raising.

By degrees he learned the value of manures and commercial fertilizers; how to properly apply them and their different effects on different crops. He mingled with growers of other sections, with his strong sense separating the wheat from the chaff and applying the knowledge thus gained to his own needs.

In time his fame became a matter of county pride. At the state fairs one might show enormous strawberries and magnificent asparagus, but the man from John's county would say: "Yes, they are werry fine, but they don't come up to Doe's stuff, now you may bet onto it!"

But Doe's chief success was in his superb method of handling his produce, after having spent time and money growing it. His plantations were laid out with care and with due regard to their convenience to every other branch of work; the sorting and packing sheds were located at the ends of the rows where the crates could be lifted into the wagons without carrying. Every crate and box was scrupulously clean, the boxes were stamped with his name and address, and the crates, painted and and numbered, also bore his address. In some cases, where his fruit went to supply special customers, each box was stamped with the name of the variety it contained, and the inside of the box was lined with fresh strawberry leaves; the crates were made especially for the purpose, so that the boxes could be heaped high.

"All nonsense!" say you? "Impossible!" say you? "Impracticable!" say you?

Impossible and impracticable with large quantities, simply because the local demand would not be large enough to warrant the time and trouble. But how much nonsense is there in the difference between 10 cents a quart, the market price for ordinary fruit, and 20 cents to 25 cents for these specially packed berries? It *may* be nonsense, but it is also money.

"About this time," said Doe to the writer, "I had the New York fever. My produce was raised in such quantities that the local trade could not handle it, and I must look to a larger market. New York seemed the 'land of promise' in this case, and there I wandered one day. I spent three days going through the markets noting the quality of the produce, manner in which it was packed, the price it brought, etc., and then I went back home."

Ah! here is where our friend placed a solid rock in the foundation he was building; when he went back to his little farm, he had a good general idea of what the New York market required in the way of produce, but not that only, for he realized that the consuming public like their goods done up in attractive shape and are willing to pay well for the attention.

Again he showed his knowledge of business, farmer though he was, for he told me that he ascertained the financial and *moral* standing of one of the commission men with whom he talked, and being satisfied with it wrote him substantially as follows:

"*Dear Sir*:—I am engaged in fruit and vegetable raising near this town, and would like to ship my produce to you to be sold. My products are in every way first-class and will be nicely packed. I shall expect the highest market price for such quality of stuff as I send, and am willing to be largely guided by you in the matter of quantity and time of shipment. Let me hear from you and oblige, Yours respectfully,

JOHN DOE."

The response to this letter from the cautious commission man was a request for a small consignment of the then seasonable small fruit, red raspberries. They were sent, packed in the same attractive manner in which Doe ever packed his produce, and—well, suffice it to say, for over ten years this dealer handled the products of Doe's farm, always securing the highest market price.

As we have said, Doe's plan of work was on the same general principles recommended in this series of papers. In handling small fruits the pickers were put into the field in charge of a competent person, and each one given a tray holding four quart or pint baskets as the case might be. The pickers were instructed to take from the vines and bushes only the perfect ripe fruit for the baskets, but were expected to pick and throw away any decayed, bird-pecked or nubby fruit they discovered. As the baskets were filled the trays containing them were set in the row and an empty one taken up, these having been placed at convenient distances all along the rows. The filled tray is taken in charge by a man who gives the picker a ticket bearing his or her name, provided the baskets are filled as required; if not they must be made good before the ticket is given the picker.

The tray is carried to the sorting-house, where the berries are looked over closely before being put into the crates. So far as possible, and always for the first grade of fruit going to New York, only one variety of fruit is placed in a crate. The crates are carefully placed on the platform of a spring-wagon and taken to the shipping point, the horses *walking*. The day before this consignment is shipped Doe writes or wires his commission man thus: "Will ship 5 o'clock train to-morrow morning, 25 to 35 crates first grade strawberries."

[In this connection we would refer the reader to an article by a New York commission man in February AMERICAN GARDEN, page 74.—ED.]

Frequently our friend Doe adds a touch to his packages by wrapping or tacking colored netting over the peach baskets, or placing a few fresh cut leaves among the fruit, etc., etc. He also makes an occasional trip to the city to see for himself what is going on, for he has no idea of falling behind the times.

His fruits and vegetables are always uniform in size; no need to look over the baskets and find a layer of large fruit at top and bottom and the centre composed of inferior stuff. In bunching radishes or beets he does not hide two or three little ones in the middle of the bunch, nor are his asparagus bunches filled out with the ends of the plant stalks. In brief, his products may be depended upon in all respects. In return for his goods he demands and receives the highest market price; and further, as we have said, when he puts up extra fine fruit in attractive shape, he is well paid for the care.

RECAPITULATION.

It seems unnecessary to the writer to pursue this subject farther; we have tried to cover the ground thoroughly, showing the comparisons of methods and the results of each. When the whole subject is narrowed down and brought into concise shape, it seems to be completely covered by the one general rule, viz.: To grow proper varieties, harvest them properly, pack them honestly and attractively in clean firm packages, and put them on the market in good shape and in a business-like matter to *be sold on their merits*.

Despite the growls of the producers, the slights at commission men and the sneers at articles written on the subject, it seems to us at least possible that the blame for poor prices for produce must, a share of it, and the larger share, be laid at the door of the producer himself. We do not ask you to take our word for this, but *do* ask that you take the trouble of refuting or verifying what has been written by spending a day or two among the markets of any large city and seeing for yourself.

We dislike to charge any American gardener or fruit-grower with ignorance of his business, but it is a palpable fact that too many shippers of produce to the New York markets are wofully ignorant of how fruit should be packed to bring a fair price.

Obviously then, the future of fruit and vegetable growing is largely in the hands of the grower; a proper conception of what is required by the rapidly-being-educated consuming public, and an intelligent catering to that desire, will improve the present status of the business. The present prevailing carelessness, and in too many cases inexcusable ignorance, will sink the grower deeper into the financial mire. Which plan shall govern? K.

FLOWERS SUITABLE FOR CUTTING.

DESIGNS AND BOUQUETS—THE HARMONY OF COLORS—
VARIETIES FOR USE.

THE PRESENT age is one of vacillating ideas in the relation of flower lovers to buds and biossoms. This is owing largely to the craze of fashionable society for change; what was considered "just the thing" for the season of 1889 may be out of style and old-fashioned the present season. So then, we may come to the logical conclusion that in flowers as well as in clothing, fashion's decrees are as inexorable as were the laws of the Medes and Persians. True, the skilled artistic florist and decorator is to some extent the arbiter of the social standing of those flowers which he so deftly weaves into harmonious designs, and, if he be diplomatic, is usually able to turn the tide of fashion's vacillating mood in any direction he may will, to a greater or less degree.

In attempting a complete list of flowers in use for bouquet and design making or other decorations, some which may be named would be used in Chicago, yet be entirely out of fashion in New York, and *vice versa*. Again, modes of arrangement are as restricted to certain localities, as are flowers used; but there are two fundamental principles of floral work, the foundation on which rests the entire structure and from which no artistic designer dare depart, viz.: the harmony of colors and the suitability of the blooms used in the formation of the design for the purpose of both his work and the purpose for which the design is intended. In these respects, the amateur can make no mistake; if he follows strictly the law of color in nature, however crude the mechanical part of his work, it will be a thing of beauty.

As a matter of fact, the true artist with flowers is as varied in his modes of treatment as the knight of the brush; for while both may understand the harmony and contrast of colors, one will be able to fashion a design in a short space of time which may be a "poem in nature," while the other, despite the proper combination of colors, will show, as a result of his work, a design not devoid of beauty, but mechanically stiff.

It is well for the amateur that many of the common garden flowers are suitable for floral design work, else he might be puzzled, in his ignorance of the art, how to make five dollars' worth of flowers and two dollars' worth of work bring forth a design which would be sold for $25.

In the formation of bouquets and designs, green is, as a matter of course, indispensable; it serves as a background against which nearly all shades look attractive; in bouquet making or the arrangement of flowers for corsage wear, green may be introduced or not as is deemed best; oftentimes the foliage of the flower used is sufficient, and indeed in some fashionable circles is deemed the only correct style. For designs, smilax, *Asparagus tenuissimus*, English ivy leaves, vinca, *Lygodium scandens* and adiantum are the principal greens used. For light airy work and festooning, smilax is probably more largely used than anything else; while for close compact designs, English ivy leaves are preferable.

The list of flowers suitable for cutting covers a most extensive field, embracing, as it does, all flowers which do not easily droop nor whose petals fall readily, and whose stems are sufficiently long and stiff. Last summer the writer was called upon in an emergency to prepare a presentation basket of flowers and 250 boutonnieres, and two hours to do the work in! The basket took all the choice flowers we had, for the trade had been heavy that day, and we were obliged to fall back on what was growing out of doors and the few remaining in the greenhouse. Here is what we used: For green, sprigs of smilax, rose geranium leaves, vinca leaves and sprigs of rose bushes; for flowers, ageratum, geraniums, heliotrope, alyssum, violets, dianthus, carnations and a few rose buds. True, the variety was great and the flowers common, but our patrons were satisfied. Of summer flowers, in addition to those named, asters, pansies, roses, mignonette, fuchsias, begonias, chrysanthemums and many of the blossoms from shrubbery may be used for floral work with good effect.

In the greenhouse, during winter, we have for use orchids, roses, camellias, geraniums, carnations, violets, begonias, ageratums, alyssum, mignonette, heliotrope, chrysanthemums, stevias, tuberoses, lilies of the valley, bouvardias, azaleas, callas and other lilies, tulips, narcissus, marguerites, etc. The list is certainly large enough to suit the most fastidious tastes. Undeniably, roses are the most popular of all flowers for cutting, and are used for all purposes where flowers can be used; orchids are beautiful and fashionable, but expensive.

In the making of "designs" one must be governed by the purpose for which the piece is intended. For funerals, it was once the custom to use nothing but white flowers with some green, but now, when the selection is left to the florist, bits of suitable colors are introduced. One of the most beautiful inexpensive floral designs we ever saw, was a cross made wholly of smilax for green, the edges filled in with blue ageratum and the center packed close with white carnations. In large designs, calla, Harrisii and candidum lilies are used with good effect.

Taken as a whole, the selection of flowers for ordinary purposes is, in reality, largely a matter of individual taste, as florists who supply this trade can fully testify. The wealthy mourner demands the most beautiful floral offerings to lay at the bier of a loved one. The poorer people have perhaps but a sprig of syringa to lay before their dead, but are happy in being able to have even this. Attempts have been made to taboo flowers from funerals, but they have failed simply because nothing can adequately fill their place.

> "Who can paint
> Like Nature? Can imagination boast
> Amid her gay creations, hues like hers?
> And can he mix them with that matchless skill,
> And lay them on so delicately fine,
> And lose them in each other as appears
> In every bud that blows?"

K.

QUESTIONS BY AN AMATEUR.

ANSWERED BY AN "OLD HAND" AT THE "PLAY WORK"—PLANTS FOR AN EXPOSED POSITION—HARDY FLOWERING AND HERBACEOUS PLANTS—OVER-SHADED CHRYSANTHEMUMS—CHOICE LILIES.

I am a subscriber to and constant reader of The American Garden, but a beginner at gardening, full of zeal and ignorance. Were I the only one of this sort, I would not trouble the paper with this letter, but I know at least thirty just such persons who would be helped by what would help me.

1. Could there not be a department for us ignoramuses, where we could learn to manage our little gardens without emptying our purses every year into the pockets of the nurserymen?

2. My house faces the north, and there is in front a little garden upheld by a stone wall two or three feet high. The soil is gravelly and dry. It gets the sun morning and afternoon. What list of hardy perennials and annuals would prefer such a situation, and what list of such plants will submit to these conditions, though not preferring them?

3. What drooping plants would grow on the edge of my stone wall to fall over and conceal it, and what climbers, either perennial or annual, would do best in this cool and shady position? A nurseryman to whom I applied for advice, as well as plants and shrubs, set out twenty-five roses, all perfectly hardy, he assured me. The next summer one alone survived, and it has not yet blossomed. This was but a sample of his supplies.

4. The directions in most books on gardening are not sufficiently elementary for beginners. For instance, I have been struggling to raise chrysanthemums for two years past; have bought healthy plants, which all dropped their blooms and were devoured by aphides in spite of tobacco smoke, showering and the most approved insecticides. Meantime, I have read English and American periodicals diligently, seeking light, and wishing I lived far enough in the South to raise these charming flowers out of doors, but convinced that great skill must be necessary to raise them at all in this climate. Last week a lady told me they were perfectly hardy here, and that the roots survived our coldest winters. Not a hint of such a thing has my reading furnished. Now, it would be very pleasant if the Garden would give a list of a dozen good and hardy chrysanthemums, with plain directions for starting and cultivating them in our gardens.

5. I trust my suggestions here will not be thought impertinent. In the multiplicity of species given in the catalogues, one gets bewildered. I should rather have the six best sorts of lily, iris, clematis, narcissus, etc., pointed out, than to be left to my own devices and discouragements.

C. M. B.

Cambridge, Mass.

ANSWER BY THE EDITOR.

1. Yes, that is just what we want to do—to give information that will enable our readers to manage their fruit, flower and vegetable gardens, so that they will become both pleasant and profitable. The only way we can do it is for our readers to state their necessities, to ask for what they want, and they will be answered by the specialists we employ for this very purpose. We cannot promise to be always correct, as there may be conditions of climate and soil we do not clearly understand; but we will promise materially to assist all who apply, and that without other motive than to impart information, the only article we have to sell.

2. Your location and soil is about as poor for a first-class garden as it is possible to picture, but if grass or plants of any kind will grow, flowering plants will. Next to the house, or between the house and the path, if such there be, we should say plant native ferns, and especially the maiden hair, *Adiantum pedatum*, also clumps

of Solomon's Seal, and Jack-in-the-Pulpit, both of which do splendidly under cultivation and in the shade. These are all of perennial habit, and form a beautiful mass of green, contrasting finely with all other forms of vegetation. For the more sunny part of the yard the following herbaceous plants will do nicely: *Hibiscus californicus*, and some of the hybrid varieties; delphiniums, campanulas, lily-of-the-valley, day lily (*Funkia subcordata*), nearly every species of lilium, particularly *L. superbum*; iris in variety, particularly *I. Kœmpferi*; sedums; bleeding heart, and other species of dicentra. As for climbing plants, the *Adlumia cirrhosa*, one of the most beautiful, simply delights in shade, while the morning glories will be truly glorious with but little sun. Their flowers will last until noon in the shade. The adlumia is a biennial, but after it once flowers, it will take care of itself without the slightest trouble. It does not run or flower the first year from seed. Among the annuals that do well in partial shade are the pansies, balsams, mignonette, coreopsis, adonis, snap dragon (which is also biennial), browallia, *Convolvulus minor*, lupins, marvel of peru, forget-me-not, nemophila and sweet sultan.

3. If there is room at the base of your wall, the best possible plant is the *Ampelopsis Veitchii*. It would soon cover it so that not a rock could be seen. If the plants must be set on the inner side of the wall, the *Nepeta Glechoma* will fill the bill. It is a perennial, and will grow in sun or shade. There is a variety with variegated foliage (white and green) that is very ornamental, but we do not think it perfectly hardy.

4. The trouble with your chrysanthemums has undoubtedly been that they have had too much shade. They should be grown in full sunlight in the open ground during summer; then the aphis will not trouble them. When the plants are taken into the greenhouse, tobacco smoke is an antidote for the enemy. It is worse than folly to grow these plants in the house during summer, or in the garden, unless there be a free circulation of air and unobstructed sunlight. None of the modern chrysanthemums are hardy, and we do not know of a collection of the old varieties; yet they are common in old gardens, and grow without the slightest difficulty when once planted.

5. The best six lilies are candidum, speciosum, album and rubrum superbum, auratum and elegans, All the clematis are good, and none better for shade than our native sorts. Narcissus are all good, but the polyanthus section are not hardy; in fact, nearly all the bulbs should be protected against frost. The German irises are hardy, and next to the *Iris Kœmpferi*, the most beautiful.

ARTIFICIAL CLIMATES.

ONE OF the time-honored subjects in the farmer's conversation is the weather. It is always a bad season for crops. "The like of this hasn't been known for a generation." "Uncommon unseasonable weather." "Too much rain." "Dreadful dry spell we're having," and so on through all the dismal year. The weather explains all the farmer's failures. The successes, of course, are due entirely to the farmers' skill and industry—in spite of the weather. The gardener is less doleful about the weather and seems to view the changing seasons with far more composure. It is not clear, at first-sight, why there should be this difference between the farmer and gardener. Both depend upon crops raised in the open air, both depend on rain and sunshine, dewy nights and warm growing days. One is celebrated for his little wail about "dreadful late season," or "the uncommon dry spell of weather." The other has not really very much to say about it and goes right on tending to his little patch as if the weather was of very small consequence.

The weather is of vital importance to both farmer and gardener. Both must have sunshine and rain, warmth and even cool, dry nights to ripen the crops. May it not be that the gardener can teach the farmer a lesson? May it not be true that the garden is more independent of the weather than the field? The quickest way to get at this matter is to examine the methods of the farm and garden in regard to so common a matter as the rain. A field crop of corn is left to get such water as the clouds, once called "the wandering water-pots of the sky," may supply. A bed of choice strawberries for the family is practically independent of the clouds, for they can be easily supplied with water from the well, the street mains or the old barrel under the spout. In regard to the rain such small crops are then in a purely artificial climate. As far as the clouds are concerned, the gardener makes his own climate and gets up a little shower whenever he thinks the crops need a wetting. It is becoming more and more general in gardens to supply water to the crops whenever needed, and a wind-mill, water tank, pipes and hose are regarded as part of the essential machinery of a first-class florist's or market gardener's establishment. In the rainless districts of the far west, and in California, artificial irrigation upon a gigantic scale is already making whole counties independent of the rain. In this sense parts of California are already enjoying an artificial climate. Ultimately, no doubt, all farming will be quite independent of the rain-fall. Improved machinery, cheap power and cheap pumps and pipes will make it possible to supply water at will to large crops of corn, oats, grass or wheat, precisely as water is now supplied to gardens and orchards. We may not look for this at once, yet it is plain that it is coming, and to-day no commercial market garden or florist's place can afford to go without the best appliances for supplying water to the out-door crops. There is rain enough in the year. The point is to save January storm water for use in August droughts. The business of raising vegetables for city markets is simply a manufacture, and some day it will be conducted on manufacturing principles. This will mean absolute independence of the rainfall, and a complete control of all the water supplied to the crops.

When we come to the matter of sunshine and the temperature it seems as if we were practically helpless and at the mercy of the climate. We plant our seed, and while we can supply water when needed, we cannot cause the temperature to rise or fall a single degree. This is not quite true, for the moment we put a few heads of lettuce under a hot-bed sash, we have placed them in a purely artificial climate, where we are very largely independent of the heat of the sun, and need not care particularly for cold winds or warm.

Glass we have had for a long time. Greenhouses have been used for more than a hundred years, and yet we are only beginning to understand how essential glass is going to be to both the farmer and gardener. We feed a cow for three objects: to keep her warm, which means to keep her alive; to cause her to give milk in abundance, and to gain flesh. The food is largely used by the animal to keep her warm. If she stands in a cold, draughty barn and is put out in a windy, open field on a cold day, just so much more food must be consumed as fuel to keep her warm, and just so much less goes to supply milk and flesh. The same cow in a glass-roofed structure artificially warmed would chew her cud in comfortable content, and devote the force obtained from her breakfast to milk and fat. The idea of forcing cows under glass may seem just a little amusing at first glance, yet it is founded on both science and common sense, and we shall live to see it done. We already do it for poultry. Why not for cattle? The mere shelter of a glass roof exposed to the sun will give a summer temperature to any reasonably tight building whenever the sun shines. Cows under such a glass roof would simply be in a summer temperature, and it would be difficult to prove that the cows would not enjoy it, and enjoying June weather in January would respond in more milk and more flesh.

In the matter of plants it is evident that the use of glass is to become of more and more value. We sometimes think glass is only for the rich, who want Black Hamburgs, or the florists who want flowers out of season. The market gardener already uses glass for his early crops, his lettuce and radish, and to forward his young tomato plants. Glass gives us complete control of a climate—not the climate, but an artificial climate. By means of steam and hot water we are enabled to convey the heat of a fire to a distance. It becomes possible with the aid of glass and our present systems of heating to have the heat resulting from flame, without the products of combustion that result from flame. It would seem as if in the future the entire business of raising plants would be in greater or less degree controlled by the use of glass and heat. May it not be possible to transform gardening from a handicraft to a manufacture? If capital can be applied to use machinery in making shoes, why may it not be employed to manufacture crops in artificial climates, and very largely by the aid of machinery? A few years ago it was thought that only a hen could brood over eggs. To-day we do all her work in an incubator, which is practically by machinery. Chickens are even fed by machinery—why not, then, cabbages, beets or rhubarb? We are too apt to regard a plant as something too valuable to destroy for its product. Florists have learned better. Once they saved their rose vines year after year in their greenhouses. To-day they force young plants into flower, get a crop and throw them away. The crop is the thing, and not the plant.

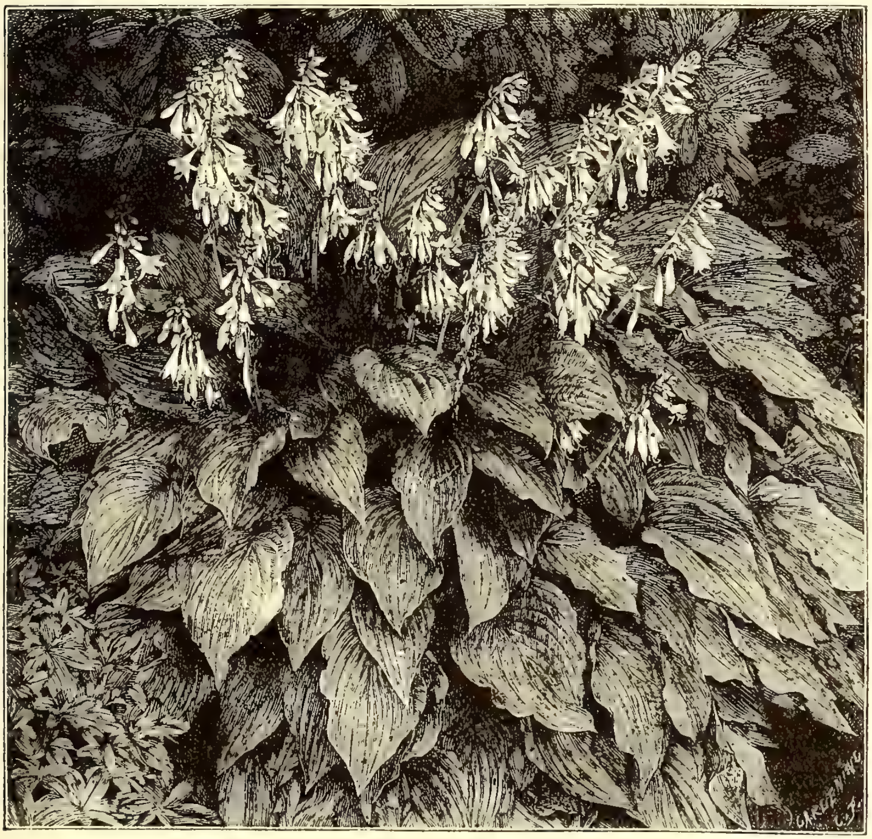
These ideas are suggestions for the future. We have yet to learn how much one acre will produce, because we are subjects to the caprice of our climate. The gardening of the future will use artificial climates to produce crops far exceeding anything we have yet seen. Gardeners will manufacture crops, and then, with capital combined with machinery and science, we shall see the new gardening that will produce vast quantities of food at lower prices and a higher profit than now.

CHARLES BARNARD.

FUNKIAS.

Beauty of leaves and flowers both considered, few plants among the long lists of hardy perennials give, year after year, more satisfaction than the funkias, plantains or day lilies, as they are generally called with us. To be appreciated they must be seen growing to perfection, and that means leaving them undisturbed in good soil until they form good-sized clumps, which usually takes several years. We have seen them forming perfect hemispheres of green, every leaf as regularly placed as if by art, and shedding water like a shingle roof. A well-grown plant has a noble aspect and an elegant outline. Some varieties have a bold palm-like foliage; others are like the aspidistra.

They bear in profusion spikes of lily-like flowers, with long graceful stems, exceedingly useful where cut-flowers are wanted for jars and vases. They last well in water, but the individual flowers are short lived—most of them flowers of a day; but others bloom daily, and the faded ones can be easily removed, the flowering stalks retaining their beauty a long time in water. They are beginning to be used for pot culture and are exceedingly attractive. A good plant makes a fine subject for exhibition purposes. They are fine for small lawns, borders of shrubbery, rock-work and wild gardening, but we do not think them adapted to edging beds, as is often attempted; well-grown plants take too much room, while small, newly transplanted ones look weak and thin. If wanted in winter they should be potted in the fall and put in cold-frames, and brought gradually on, forcing being done slowly if good foliage is wanted. The best means of propagation is by dividing the old clumps as early as the frost leaves in the spring. Cut the clumps clean through with a sharp spade, leaving several crowns to each portion. There is some confusion among botanists regarding the genus from the number of synonyms and garden varieties. The variegated-leaved varieties of *F. ovata* and *F. lancifolia* are favorites for pot culture. *F. Sieboldiana* has magnificent leaves, of a bluish metallic green; this tone is intensified by good soil and cultivation. *F. grandiflora*, *ovata* and *Fortunei* are considered the best other sorts. The flowers range in color from violet to purest white. The fragrance of some varieties is unexcelled and of a notable delicacy. The genus is an admirable one.

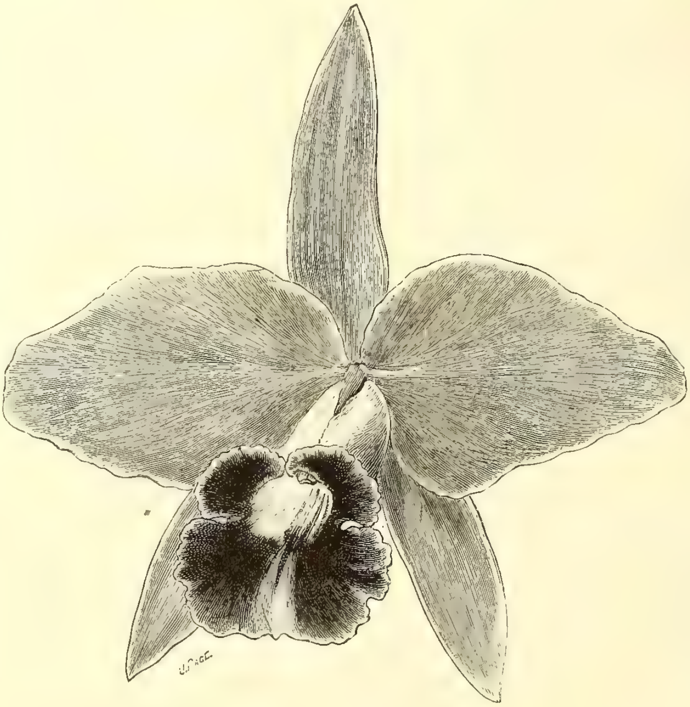


A Good Plant of Siebold's Funkia: *From Gardening Illustrated*

SOME ORCHIDS AT KEW.

THE high prices formerly paid for orchids drew attention to them, from people knowing nothing of them and latterly, as they are becoming familiar from exhibitions and extended cultivation, they attract for their own sake. Collections worth thousands of pounds are the pride of many gentlemen in England, but the finest collection in the country is that at the Royal Botanical Garden at Kew, on the Thames, in the southern outskirt of London. This is the richest institution of the kind in the world, embracing 75 acres, and open gratuitously to the public every day in the week. Special pride is taken in the palms, ferns and orchids. Of the last some of the most notable are the following :

Lælia pumila var. Dayana. The lælia family is highly valued on account of its magnificent flowers. Such species as *L. elegans*, *L. superbiens* and others of the same type are the most common in gardens.

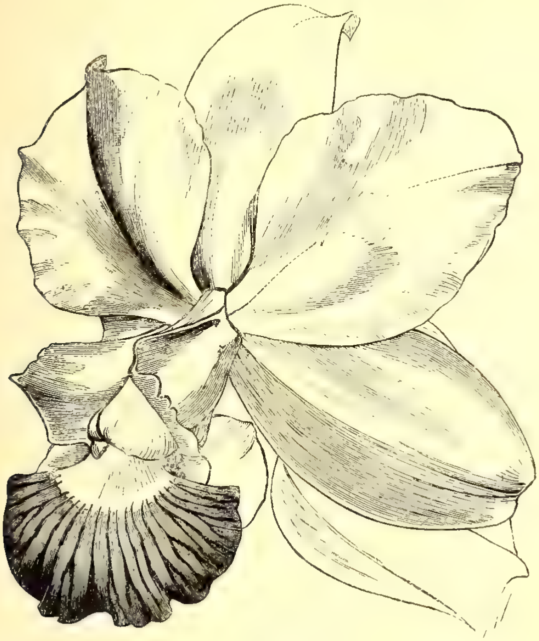


Lælia pumila.

The subject of this note is of quite a different character. It is a charming plant, though small. It is a native of Brazil, and may easily be recognized by its dwarf habit. The rhizomes are produced rather high above the surface of the soil ; numerous pseudo-bulbs are given off from them, the largest not measuring more than an inch and a half in length and about half an inch in thickness. The leaves are two to three inches long, and not quite an inch in width. The flowers, as in the case of all the lælias, are produced from the apex of the pseudo-bulb from each growth, on a pedicel or flower stem two inches long. The sepals and petals are of a rich mauve color, each about two inches in length and curling backward. The lip is bell-shaped and very handsome ; the body of it is dark purple, except just at the point where it meets the sepals and petals, where it is of the same color as these : the inner portion of it is very striking, being prettily striped with rose and purple toward the sides, while on the bottom there are five raised ridges, dark crimson in hue, and contrasting in fine style with the other colors.

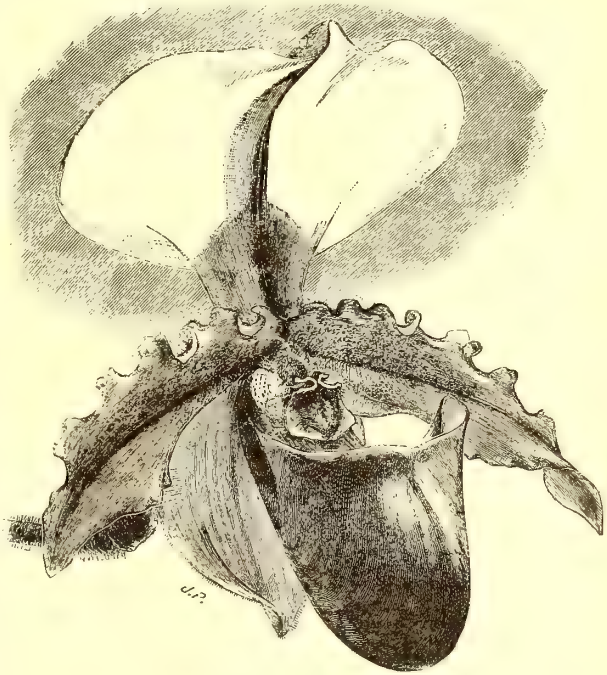
This orchid may be successfully grown in an ordinary cattleya house, kept at a temperature not lower than 55° Fahr. during the cold months. The plants thrive in a good compost of peat fibre, sphagnum moss, and broken pots. They may be watered freely while growing, but as the bulbs begin to ripen, the amount of water given must be reduced, else the plants will be unduly excited into premature growth, and the flowers will be injured. Water may be entirely withheld during November, December and January, by which time the plants will be making vigorous growth. It is a bad plan to disturb them except when to do so is compulsory ; therefore, I would recommend orchid growers carefully to top-dress their plants occasionally ; then they can dispense with repotting for a considerable time, and the plants will be benefitted to no small extent.

Trichosma suavis is a useful orchid, and can be easily grown in the cool house. It is a native of Brazil, of distinct habit. The leaves spring from a rhizome ; the leaf-stalks are about six inches long and at the ends bear two leaves from four to six inches long and of a yellowish green color. The flower-spike is produced from between the two leaves, each spike bearing six or eight flowers, sweet scented, as the specific name implies. The flowers are of a somewhat creamy white color, much like those of *Cœlogyne oculata* in shape, but slightly smaller. The lip is very handsome and of the same color as the body of the flower, and barred with a rich chocolate color. This orchid will grow well in a compost of peat and sphagnum. Pot culture is the most suitable; the pot should be drained about one-third of its depth with good clean potsherds and charcoal; abundance of water may be given while the plants are making their growth, but the quantity should be gradually diminished as they reach maturity. Thrips are fond of attacking this orchid, as the leaves are of a somewhat soft nature; their presence may be easily detected, as the leaves become marked. To prevent their attacks the plants should be occasionally washed with a mild mixture of soap and water; strong insecticides should be avoided in an orchid house. By the use of this wash the pests will soon be effectively routed, and the plants at flowering time will present a very gay appearance.


CATTLEYA WALKERIANA.

Cattleya Walkeriana is rare in orchid collections, perhaps for the reason that it is rare everywhere; but it deserves a place in any good collection. It is, perhaps, one of the most distinct of the whole cattleya family. The pseudo-bulbs are short and thick, being only two inches long and more than an inch in diameter, resembling *Broughtonia sanguinea*, but not so flat as the latter; each pseudo-bulb bears a solitary leaf, which is exactly of the shape and size of a hen's egg. The flowers, of a dark mauve, are usually produced in pairs from last year's pseudo-bulbs. The sepals and petals are about two inches long and an inch wide. The lip is darker than the other parts of the flower, which is a pretty rosy-purple, and very nicely shaped. A prominent characteristic is the column, which is half an inch broad and fits closely to the lip: in fact, it lies on it. The rostellum is yellow, the only deviation from the colors of the other parts This being a very dwarf species, growing it in baskets is recommended; for then the plants may be suspended nearer the glass, and obtain more light, which is an important factor in the successful cultivation of orchids. This species may be grown in the cattleya house with a mixture of peat fibre, sphagnum and charcoal, Is produces its flowers during the resting period; that is, during October, November and December, when it requires no water whatever; but after growth has commenced, a moderate supply will be welcomed.

Cypripedium Spicerianum. The "Lady's Slipper" tribe of the orchid family varies widely both as regards the habit and beauty of each individual; for while there is nothing very attractive about the flowers of the North American species (*S. pubescens* and others of a similar nature) though their forms are quaint, there are far more attractive species from the East Indies, such as *C. Spiceranum*. Many cultivators seek for only the showiest varieties of Cypripedium, while in fact each species has its own charms. *C. Spicerianum* has not been in cultivation more than ten years, and many collections are still without a specimen. It was first flowered in England by Mr. Herbert Spicer, an orchid amateur of Godalming, in Surrey, who received it amongst other unnamed species from India. Being new, it was named after him by the late Prof. Reichenbach. Shortly afterwards the collectors who are employed by English orchid merchants, discovered a large quantity of the species, and shipped them for cultivation in England.


CYPRIPEDIUM SPICERIANUM.

This species produces leaves from six to nine inches in length, slightly wavy at the margins; the upper surface is a dark green, the upper part spotted with a dark red near the base. The flower scapes are from eight to twelve inches in length, somewhat slender, but quite erect, bearing a single flower. The flowers are three inches across; the dorsal sepal is rather broad, the edges being recurved, giving it a folded appearance. It is almost pure white, with the exception of a purple line running lengthwise through the center, and at the base there is a green blotch of pretty olive color, tinged with dull red spots. The lower sepal is greenish-white and rather broad; the petals or lateral lobes are narrow, curving forward and very deeply undulated at the margins. They are a yellowish-green, with a dull red maculation, the midrib being crimson. The Slipper is of a good size, somewhat bell-shaped and a shiny green: the staminoid is crimson-purple, with white margin.

C. Spicerianum is grown in the East Indian house at a temperature of 60° to 70° Fahr., in compost of peat, loam and sphagnum. The plants do best in shallow pans, with about one-third drainage. Plants of this species, like the majority of East Indian cypripediums, have no particular resting period; therefore, water may be given the whole year 'round.

Kew, England. P. WEATHERS.

THE SPIRÆAS.

Scarcely a genus of hardy shrubs is so rich and beautiful in its different species as the astilbe and spiræa. They are so numerous that many attractive sorts must be excluded from even the most liberal selection for the average sized garden. *S. lobata*—Queen of the Meadows—is one of the best hardy plants found in the meadows of Pennsylvania and westward. The handsome flowers, of a deep peach color, are produced in clustered panicles on long, naked peduncles, and under cultivation greatly improve in color and size. In making a selection for garden or border planting we should extend the flowering season as long as possible by a judicious selection of the most attractive sorts that bloom in succession. The following are among the best.

The Japanese *S. Thunbergii* and the double-flowered *S. prunifolia* are the first to unfold their blossoms. The first forms a bush with numerous branches, slender, arched shoots and lanceolate leaves, which are bright green and retain their freshness till late in the season. The flowers are like those of the hawthorns, but smaller, and are produced in such profusion that on the principal shoots but little foliage can be seen when they are in full bloom. The second usually blooms soon after the other, but is much larger and more showy, a well-grown specimen often forming a bush five or six feet high, with gracefully disposed branches, the upper parts of which are wreathed with small, double, pure white flowers of considerable substance, which are good for cutting when just about to expand. A common fault with the spiræa for cutting is that it soon falls and creates a litter. The foliage of this variety is the brightest and richest at the time of early autumn frosts.

S. ariæfolia is one of the largest growing in the whole genus, often reaching a height of ten feet, forming a somewhat erect but branching shrub. It is a summer flowering sort, with white creamy flowers in open panicles. On account of their abundance and the habit of the shrub, this, when in bloom is one of the showiest varieties.

S. Douglasii is a shrubby North American species of remarkably handsome erect growth, forming a clump of densely packed shoots which are terminated by dense erect, rosy-red flowers at blooming time. The foliage is more or less tomentose, though this feature, as well as the color of the blossoms, is variable. Some of the different forms are known as tomentosa, Nobleana and Menziesi, but the best is the sturdy form with deep colored flowers.

S. callosa, a midsummer flowering sort; blooms in succession for a considerable time. The deep rose-colored blossoms are arranged in flattened corymbs, which, with the unopened buds of a deeper hue produce a very pleasing effect. The young sprouts and leaves have a pretty bright red tinge. There are several varieties of this valuable species, one being a white, and not growing over a foot high. This is the latest of all the spiræas.

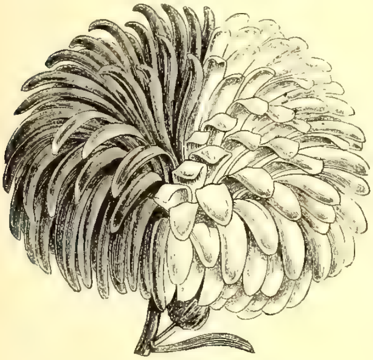
All are familiar with *Spiræa* (*Astilbe?*) *japonica*, which is widely used for forcing at Easter and grown more freely by the masses than any other variety. It is perhaps the most useful of all the genus. It belongs to the herbaceous division, and when grown out of doors forms a beautiful hardy border plant two feet high with branching spikes of pure white flowers.

Cultural directions for the shrubby spiræas are few and simple, yet like most other plants they generously respond to any special treatment suited to their needs. The great thing to guard against is a hot, dry, sandy soil, in which the summer-flowering sorts are literally worthless, having a starved and unhappy appearace. If manure water can be supplied for two weeks when the buds begin to form, its effect will be seen very quickly on the opening of the flowers. As to pruning: generally speaking, the knife should not be used except to remove old wood, which should be done in July, and the idea of pruning to make good shapes must be omitted in growing spiræas. Another point of import is to give ample room, as the plants abhor crowding and plainly resent it by their appearance. W. F. LAKE.

The spiræas of our gardens and of the Greeks, who loved to wind their flexible stems and lovely showy flowers into garlands, the meadow sweet of Old and New England, is a friend of the temperate regions, living nearer to the icy north than to the tropics. Ranging in variety from tree-like forms to those of a delicate herbaceous character; there is much to choose from, but great confusion exists in their nomenclature, and many sorts so closely resemble each other as to puzzle the most skillful botanists. The best authorities give about fifty species in the genus, but for garden purposes there are practically fewer. Soil and cultivation cause such a difference in appearance that varieties under different conditions differ as much from themselves, as far as effect in the garden goes, as do some of the species. They are easily propagated by dividing the roots, but do not like being often disturbed. Left alone in rich, moist soil, with no roots of other plants crowding them, they will rejoice our hearts and brighten our gardens in summer. Even those whose peculiar odor is distasteful as cut-flowers are delightful in the garden. D. W.

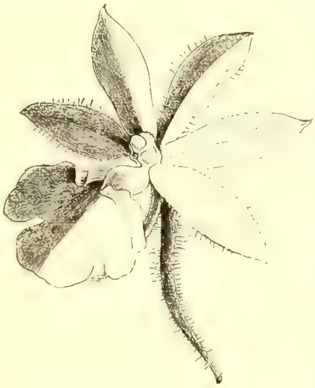
FLOWER SPORTS,

PARTICULARLY WITH REFERENCE TO COLOR VARIATION.



A Chrysanthemum Sport.

The laws of nature that govern the changes of color in vegetation are little understood, but are of great interest to investigators, and anything tending to advance the study of them should be preserved. We have reduced two little cuts from the *Gardener's Chronicle*, which also says: "We give an illustration of the chrysanthemum Source d'Or, sent us by Mr. Maries, of Lytham. One-half of the flower-head consisted of yellow, flat strap-shaped florets; the other of dark golden bronze florets, revolute at the edges. Such cases are always interesting, and are susceptible of various interpretations. That which seems most plausible in this case is, that the appearance is due to the unmixing or separation of previously blended components. In the case of the chrysanthemum, which has been crossed and recrossed, and crossed again, for an untold number of years, it is evident that the breed must be very mixed indeed, and there can be little wonder if a 'return to first principles' occasionally occurs. This theory is not susceptible of actual proof in the chrysanthemum. We are glad, then, to call in support the witness of Veitch's calanthe. The history of this is known beyond dispute; it is a hybrid between *C. rosea* and *C. vestita*. In the flower in question, the two heretofore combined elements are nearly separated. Assuming the explanation now given to be a correct one, there are still many problems left unsolved. What has induced the separation at a particular time? Why does the change occur on one or two particular shoots and those only? Why does the same change occur in the same variety at the same time in widely different localities? Ah, why? It may seem disheartening, if not futile, to some people to seek the explanation of such things, but whether we fail in our main object or not, the search is always full of interest to those who keep, or try to 'keep an open mind,' and something of interest and value is sure to crop up to reward the rational curiosity of the searcher after truth."



Calanthe Sport.

The theory of our contemporary on this particular phase of plant variegation is of considerable interest, as the careful investigator will at once seek to test it by application to cases which have come under his own observation. The question will at once arise as to whether the same theory will explain the variegation of foliage in natural "sports." Why is not this simply a phase of the usually applied theory of reversion with which all well informed horticulturists are familiar?

TIMELY HINTS FOR THE KITCHEN GARDEN.

A northern garden excels in crops that require a cool damp soil, like celery or cauliflower. The best location is a gentle slope to the south, with the orchard and fruit trees, if any, on the north border. On one side should be grapes and small fruits, on the other quinces, currants and gooseberries, if desired; then have permanent beds of asparagus, or artichoke, or rhubarb, all running down the slope in beds or rows, with room for working. The grouping of bushes on the sides leave unincumbered space for vegetables in the central portion of the plot. Potatoes, being rather unsightly, should be planted near the outer sides.

There should be a broad path at each end of the garden plot for convenience in getting to the rows, and to allow a horse to turn. Such a path should be kept well hoed and carefully weeded. A gentle slope gives drainage enough for all purposes in any land suitable for a garden. The direction of the rows being down the slope, all surplus water is taken off, and irrigation is rendered possible, if needed. A broad walk running through the center, bordered by beds of flowers, would be an added charm to the vegetable garden.

Hot-beds and cold frames are at best unsightly in a well-kept garden; for this reason they should be located near some building or other screen. They should also be near to a supply of water, all conveniently located so as to receive the constant and watchful care they are sure to need. In advising manures for a garden, I submit my experience, and advocate the use of horse manure liberally applied in fall or spring and plowed in. This can be supplemented by a choice of commercial fertilizer applied as judgment or experience may dictate. Of course plant-food abounds in the manure from other animals, also the products of the compost heap; but for the best results in the vegetable garden, I prefer the manure of the grain-fed horse that has lain on straw. For ease of application it may sometimes be necessary to make it fine by heating and handling enough to rot the straw. Other substitutes for straw in bedding, such as sand, muck, leaves, sawdust, bark and shavings, are not equal in value to the straw of grain.

The selection of seeds is of the greatest importance, as is also the choice of kinds. It is well to send for many catalogues, as they come to hand early in the year. Do not feel obliged to buy of any one simply because he keeps seeds at the next door. Order what is wanted wherever it seems best to buy. My mail seeds give as good and often better results than those secured near at hand. A reliable seedsman's novelties, and whole stock in fact, are to be depended upon from year to year, and can be ordered with assurance of success.

It may seem ill-advised to plant all crops three or four feet apart, but when land can be spared for it, the use of a horse between is a great saving of time, and labor with hand hoes and weeders. I like the Planet horse and wheel hoes. They are great time savers. The best and easiest running seed drill is the old style of Rogers' onion drill. It is light, but rather difficult to manage at first. One row with such tools is easier tended when 100 or 50 feet in length, than if divided up into rows ten feet long. Do not use narrow beds. When crops are planted in single or double rows with spaces sufficiently wide to use the horse cultivator, the work is not only much easier accomplished, but when an early crop is harvested, space is left for the use of the plow or cultivator in fitting the land for a succeeding crop. All crops, as soon as they are past usefulness, should give place to something which will mature and add profit to the garden. Even the spaces left by such crops as tomatoes, squash and corn can be sown to winter rye, which can be plowed under in the spring, or used in other ways. Method, order and neatness in work, with the use of hand-hoes and weeders where necessary, with abundance of fertilizer of suitable quality and in the right place will give good results in most soils.

Hot-beds and cold-frames for the supply of early plants are important factors in any garden. A supply of water near at hand is a prime necessity in case of drought. Shelter is important in the garden, especially for hot beds and early crops, and a fence is the easiest means of securing of it, if it does not exist naturally. 1,000 feet of boards, 12 feet long, when placed end to end, will make a fence six feet high, and about 140 feet long. Set the posts every six feet, two feet of them in the ground, and lean them from the beds a little as a better support to the shutters and mats that must be used on beds in winter, and often need drying off. The boards can be nailed permanently to the posts; or they may be cleated or screwed to them, for use in winter only, removing the boards in the spring, and replacing them in the fall, leaving the posts to stand all the time. Plank for hot-beds, where much of it is used, are better taken up in summer, and staked up again in fall, banked against on the outside with dirt, and filled on the inside with leaves, so that the pit can be opened as wanted.

Rotation should be followed, novelties tested for future use, and the most must be made of every crop. In many cases it is wise to save seeds, but where plants are grown in variety and small quantities, seeds can be bought more cheaply than they can be grown. A full garden is a treasure.

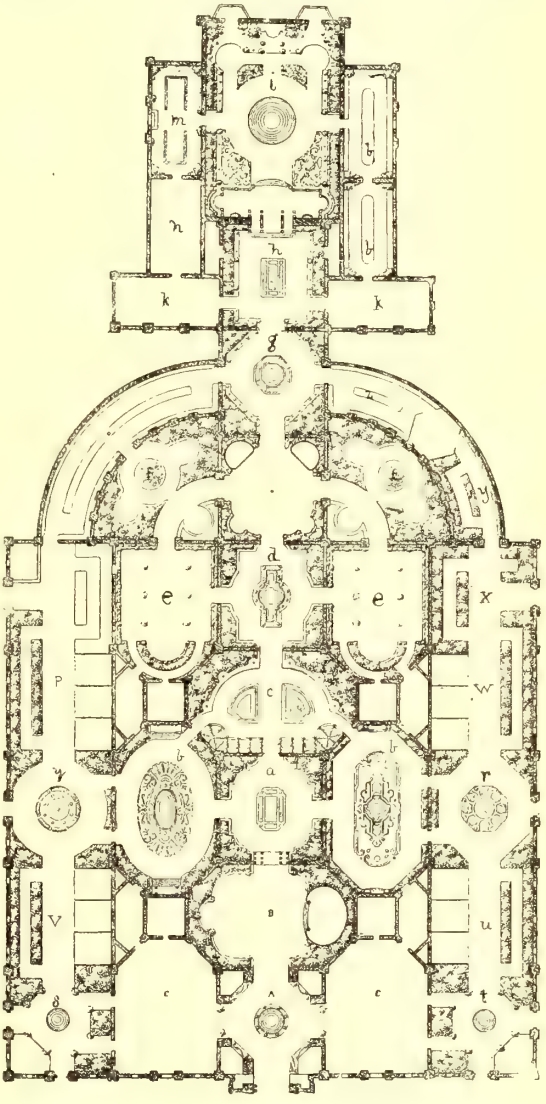
Massachusetts. W. H. BULL.

BERLIN INTERNATIONAL HORTICULTURAL EXHIBITION.

WHILE so much has been said and written about a great American exhibition in 1892 or 1893, it will be well for us to heed the fact that in the city of Berlin is to be held a great International Horticultural Exhibition from April 25th to May 5th, which will, in all probability, be a magnificent affair. Few of the continental countries will be without representation, and the English, encouraged by former successes, will be likely to make a good showing. No applications to take part will be entertained after March 1st. It will be well for those in our country interested in such things to observe carefully how this is carried out, that we may profit by it in the future.

Particular attention will be given to illustrate the relationship of decorative horticulture and architecture. The exhibition will be held in a large park and palace in the northwest of Berlin. The park is the one in which the exhibition of 1885 was held. While then only a portion of the palace was occupied, this year the whole and a large part of the park will be required. In the park will be shown glass houses containing fine hot-house plants, and in full working order. A large hall, side by side with the palace, will contain implements, etc. Upwards of 35,000 square feet in the palace will be devoted to the strictly horticultural part of the exhibition, and in addition are the winter gardens, banquet and dining rooms, salons, etc. Our largest illustration, from *Gartenflora*, shows the general plan of the palace, and the two smaller ones (Figs. 1 and 2) show the halls (*b b*) on a larger scale. Fig. 1 will be laid out with an arrangement of small beds forming a complete figure, and Fig. 2 much the same style, but is to be surrounded by decorated balconies upon pillars.

The exhibition will be mainly divided into the decorative part, greenhouse plants, roses, forced flowering shrubs, perennials and bulbs, cut-flowers, fruits, leaves, and dried flowers, grasses, etc. These again will be divided into numerous classes. The entrance is through the principal hall (*A*); in the middle of this is a large fountain, and jets of water run from the corners of the wall. In the halls *b*, *c*, *d*, *g*, *i*, *s* and *t* are fountains. All these fountains are to be decorated with plants. From *A* we come to the hall *B*, where the opening ceremonies will take place. Through a portico a passage is made into the hall *a*; this, as well as the halls *b b*, the center of *c*, the hall *d*, as well as *g*, *h* and *i*, are intended for groups and arrangements of house or bedding plants. In *d d* the beds are to



GENERAL PLAN OF ARRANGEMENT FOR THE EXHIBIBITION PALACE, BERLIN.

be of low growing plants. Over the entrances to the various enclosures are pillar and free balconies, and prominent windows will be constructed as seems desirable; the decoration of all is to be competitive. The hall *c*, between *a* and *d*, will have pavilions and pagodas. From *d* are passages to the right and left to *e e* for refreshments and music. Curved paths connect these halls, along which, and in the circular enclosures *f*, *f*, will be the products of nursery gardens, trees, shrubs, cordons, etc., and similar exhibits will also be placed in the halls *g*, *h*, *i*. In *i* spring flowers will be largely used. To the left of *i* is *m*, destined for the illustration of landscape gardening and garden literature. *N* is destined for meetings. The halls *b*, *b*, to the right of *i*, are allotted to scientific exhibitions. The hall *h* and *k k*, right and left, ar for winter garden decorations. *Z* will contain fruit and vegetables. *Y*, together with *x* and *w*, will be devoted to perennials. In *u* and *r* examples of the decoration of parlors and salons for festivities, baptism and nuptial ceremonies will be given. In *t*, *u*, *v*, will be seen the roses. The halls *y*, *r*, *s* will contain forced-flowering shrubs, and *p* the table decorations, and *s* the arrangements of cut-flowers. As the exhibition is to be an international one, the study and comparison of exhibits will be particularly valuable. The railroads will charge only half rates for all things intended for the exhibition. Red labels are supplied, to be attached to the goods, denoting that they are to be subjected to no delay.

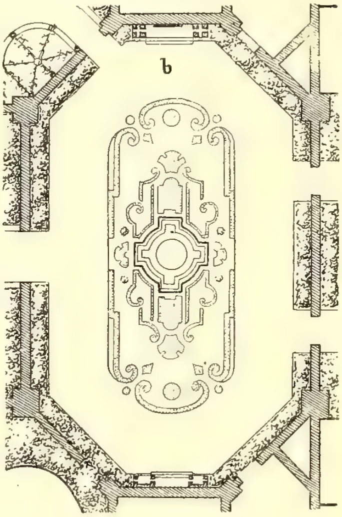


FIG. 1.

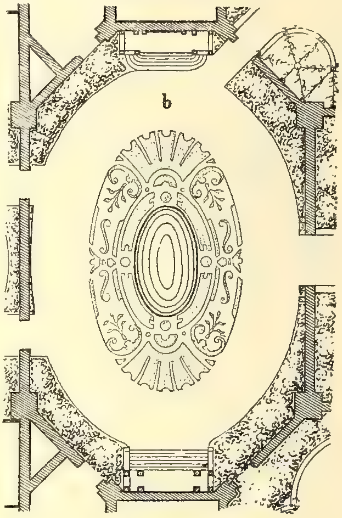


FIG. 2.

BEAUTY IN SORROW.

Seldom have lovely flowers been called upon to express sympathy for so sad an event as the tragic death of the wife and daughter of Secretary Tracy, and seldom has a prettier display of rare blossoms symbolized the affection of sorrowing friends. The two caskets were almost hidden beneath a mass of bloom, and over them swayed the graceful branches of a tall palm. Conspicuous among the many beautiful offerings was an exquisite wreath of violets and lilies of the valley from Secretary and Mrs. Blaine. Mrs. Morton sent two wreaths, one of Annunciation lilies and the other of Cornelia Cook roses. From the British legation there were two wreaths, one of white orchids, the other of Parma violets. Count Arco Valley and the members of the German embassy sent wreaths of orchids crossed at the base by palm leaves and tied with ribbons of the German colors. Mr. and Mrs. Henry Cabot Lodge sent Cornelia Cook roses and violets, and Mrs. R. R. Hitt contributed an exquisite cluster of Annunciation lilies and palm leaves. Admiral Porter sent a wreath of palms and Bride roses, and Mrs. Bancroft Davis a beautiful cluster of lilies of the valley, Cornelia Cook roses and white orchids. From Mrs. White, daughter of Senator Sawyer, came large wreaths of white hyacinths, Silver Spray carnations and Bride roses, and from Senator and Mrs. Hale a cross of white orchids and violets, resting on a base of roses, forming an exquisite and appropriate design.

While doubtless the hand of the professional florist may be seen in the arrangement of these designs, the chosen flowers bear witness to the good taste of the donors.

The custom of having flowers at funerals is one we cannot afford to abolish. Death is robbed of much of its natural hideousness by the introduction of these symbols of the Creator's love in the homes of mourning. Unconsciously our grief is assuaged and our loss tempered by the halo thrown about our beloved dead by the pure blossoms which bear silent witness of the life to come.

THE BROWN ROT OF STONE FRUITS.

We have lately entered upon a new era in our knowledge of the economy and methods of fighting the multitudinous fungus diseases which plants are heir to. Twenty, or even ten years ago, very few of these rusts, smuts, blights, mildews and rots were understood, and for still fewer was there known any successful remedy. But now, thanks to botanical investigations and experiments, we have brought under control a number of these insidious foes, and there is good reason for hoping that to many others we shall soon be able to say: "Thus far shalt thou go, but no farther."

One of the most destructive of these diseases is that known as the brown rot of stone fruits. It attacks plums, cherries, peaches, and occasionally even apples; and nearly every year causes serious losses to the fruit growers of the country. Where it is present, the fruit, while yet green and immature, begins to turn brown and shrivel, as shown at Fig. 1; and in a few days the skin becomes covered with a brown velvety down, which consists simply of the fruit or spores of the fungus. If a small quantity of this velvety material be placed under a high magnifying power, it will be seen to consist of threads of cells, as shown at Fig. 2. These cells are the spores or productive bodies of the fungus. If a plum covered by the velvety down mentioned above be lightly shaken over a piece of glass, and the glass put under the microscope, it will be found that a great many of the spores have fallen away from the threads, and the field of the microscope will present the appearance shown at Fig. 3. It is by means of these spores that the disease spreads. The wind blows them all through the orchard, many falling upon healthy plums, where they germinate by sending a minute tube which enters the fruit. Once inside the fruit, this tube continues to develop into *mycelium* which penetrates all the tissues of the plum and causes it to turn brown. This mycelium eventually develops a crop of spores, and causes the plums to become withered and dry, and to remain upon the trees in a mummied or dried condition. (See Fig. 4, page 166.) In this way the fungus stays on the trees all winter and even until the next year's crop of fruit ripens.

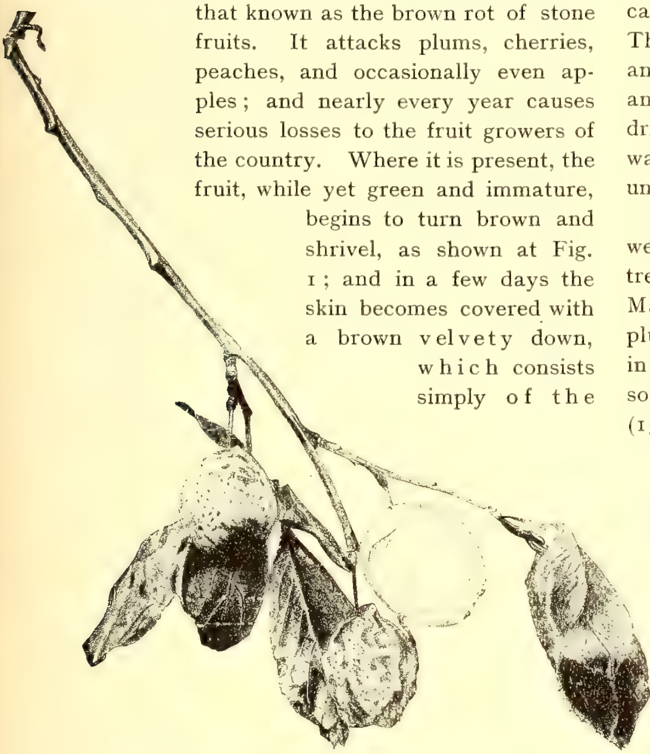


FIG. 1. PLUMS ATTACKED BY ROT.

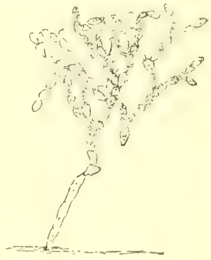


FIG. 2. THREADS OF SPORES.

At the Ohio Experiment Station the past year, we attempted to keep this fungus in check. In our treatment of the plum orchard, we began late in March by picking and burying all the mummied plums on the trees. Then we sprayed them early in April, before the leaves came out, with a simple solution of copper sulphate; and twice during May (15th and 25th), the first time with London purple alone (to kill the curculio), and the second with a combination of London purple and the Bordeaux mixture, which treatment was repeated June 1.

After these sprayings, the fruit was fairly well covered with the copper sulphate and lime, which stayed on despite the many rains until it ripened in September—a period of nearly four months. At the time of picking, an undesirable amount was still present—so much that it was necessary to wash the fruit. This year I intend trying some other compound of copper instead

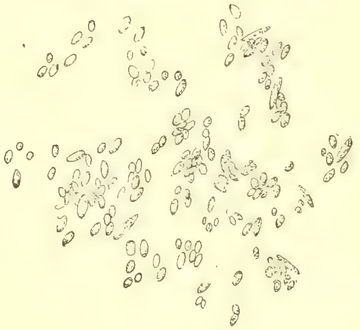


FIG. 3. SPORES.

of the Bordeaux mixture on this account. Probably the ammoniacal solution of carbonate of copper, or *eau celeste*, will serve the purpose.

The results of the experiment, although not as encouraging as I could have wished, were sufficiently so to warrant its continuation through future seasons with strong hopes of ultimate success. Although the meteorological conditions were unusually favorable for the rot, it did not appear until quite late, and injured only a small per cent. of the crop—not nearly so much as usual.

Ohio. CLARENCE M. WEED.

TWO SOCIETY WRINKLES.

NOVELTY AND BEAUTY.

Under the name of a "Boston baked bean party," a novel "sociable" furnished a deal of amusement to a party of young people during the present winter. Those receiving invitations were notified that old-fashioned costumes would be the order of the evening, and great were the routing and rummaging, begging and borrowing that ensued. As is usually the case, a good many "imitation" costumes had to be donned as a last resort, some surprisingly good ones being evolved by a few clever young ladies, who merely arranged lovely old-fashioned lace collars over their decidedly modern gowns with velvet "leg o' mutton" sleeves, while snowy aprons of sheer India linen gave the quaint finishing touch.

The Virginia reel was the favorite dance and the supper table was graced with huge bowls of Boston baked beans, loaves of brown bread, golden pumpkin pies, rosy pyramids of apples and great jugs of sweet cider. A bean bag contest was one of the interesting features of the evening—of course for the inevitable prizes. The first prize in this case was a pretty set of bean bags and board, while the winner of the booby prize rejoiced in a mammoth dish of pork and beans.

A "white dinner" given recently by one of the leaders of New York society, had Puritan roses for the leading decorations, while at the corners of the table were little split yellow egg baskets carelessly filled with convallarias. Here and there upon the cloth were mats of mistletoe, thickly dotted with its waxen white berries. The effect of all this delicate green and white bloom, with the exquisite white porcelain and satin-finished silver, was chaste and beautiful. The above mentioned willow baskets are also very pretty when filled with narcissuses, daisies or any spring flower. Partridge berries and vines, ferns and wild flowers could be utilized in them by out of town hostesses in a charming manner. A dainty device adaptable to ladies' luncheon parties is to put at the plate of each guest her favorite flower.

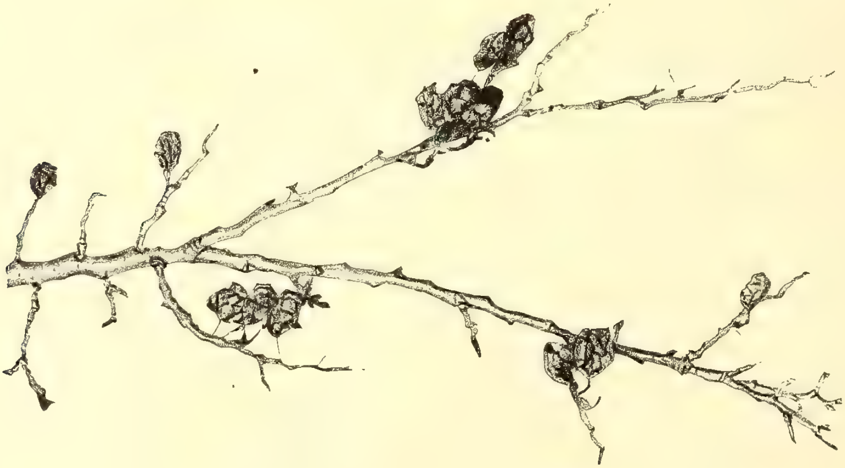


FIG. 4. MUMMIED PLUMS. (See page 165.)

WESTERN NEW YORK HORTICULTURISTS.

ALTHOUGH the past year has been rather a bad one for fruit growers in New York, they do not seem to be at all discouraged. About 200 of them met in Rochester in January at the 35th annual meeting of the Western New York Horticultural Society, and discussed important questions relating to horticulture.

Dr. Linter, State Entomologist, in a paper on "Late Experiences with Insects Injurious to the Orchard and Garden," said that a force pump is a necessity to every horticulturist who wishes to do anything against insects. As a rule, too strong solutions of the arsenites have been used. Use no more than is necessary to kill the insect and never stronger than one pound of the arsenite to 200 gallons of water. Late sprayings should be more dilute, for matured foliage is more liable to injury, probably, than young foliage. Great difference in the amount that different trees will endure has been noticed. One pound to 300 gallons water is strong enough for the peach, and one pound to 250 or 300 for the plum. White arsenic cannot be used with safety. For the rose slug and many leaf hoppers, throw a strong stream of water against the foliage once a day. The Bordeaux mixture is very important in fighting fungi. Many times fungicides and insecticides may be applied at the same time, thus saving labor. Carbolized plaster will probably prove very valuable in attacking the rose bug. A new pear insect belonging to the "case bearers" was described. It bores in the fruit making it appear as though a twig had been thrust in. If it appears in large numbers, spray with an arsenite soon after the setting of the young fruit. For cherry tree slugs spray with one ounce hellebore to two gallons water. Be very careful in use of either Paris-green or London-purple, and be sure they are fresh.

On "Embellishment of Public Grounds" Wm. McMillan, Superintendent of the Buffalo Parks, said that embellishment includes all necessary work. Select a suitable plan, but do not hold too obstinately to it in case of petty details. All features should be in harmony with each other. Make everything permanent so far as possible, because such is the cheapest in the end. Do not have too much costly ornamentation. Nature is temperate in display of colors and it is much better to have everything neat and plain than showy and broken. The carpet-bedding system is not at all artistic or refined. Use more of the native flowers, shrubs and trees.

Professor L. H. Bailey, in a paper on "The Winter End of Horticulture" spoke especially of winter gardening. There are not the great difficulties attending forcing plants, as many suppose, and winter gardening should fill up the circle of horticultural operations. Great progress has been made in the forcing of plants. We construct the houses better and understand the demands of the particular plants better. The old-fashioned roof was too far away from the plant; we now take the plant to the light; not the light to the plant. We must have the plants near the glass. The ideal form of forcing house is one which is long, narrow and low. Steam heat is better than the old hot-water system, but there is probably less difference between steam and the new hot-water system. The ideal system is a combination of both these, so that we can have either one as we want it. This can be very easily arranged with nearly all modern systems, either of hot water or steam, There are six essentials to successful forcing of plants: bottom heat, abundance of light, proximity of plants to glass, fresh air, humidity of atmosphere and adaptation of methods to changed habits of the plants.

The "Clematis Disease" said Professor J. H. Comstock, is caused by a small worm called a nematode, that also attacks a great variety of plants, among them potatoes, tomatoes and others. The fungus discovered by Professor Arthur is not the cause of the disease, although it generally appears with it. No certain remedy is known yet. Summer fallowing and the use of "catch" plants may do good. In a greenhouse, change the soil and wash the benches with lye.

Mr. Doyle on "Evaporation of Fruits," said the apple crop of New York last year was so poor that most of the apples for evaporating came from Michigan. There is a great demand in France for evaporated fruits. Mr Doyle said analyses showed that there was no danger in the use of zinc drying pans, but in order to secure the German trade something else must be used, probably some kind of heavy netting. Wood is good, but is very liable to burn. The cores, etc., are used by the jelly manufacturers.

Some of the varieties of fruits, new and old, particularly recommended are the following:

Apples.—Hubbardston Nonsuch, Sutton's Beauty, Milding, Longfield. It was the general opinion that too many Baldwins have been planted. *Pears.*—Vermont Beauty. *Plums.*—French Damson, Field, Stanton, Prince of Wales, Middlebury, Czar—a very early sort—Diamond, Peter's Yellow Gage. The last is said to be the best yellow plum. *Cherries.*—The best sour cherries appear to be Montmorency and English Morello. *Peaches.*—Two new early peaches are regarded as great acquisitions. They are Hine's Surprise and Horton Rivers. *Grape.*—The Geneva was favorably mentioned *Currants.*—Fay and Moore's Ruby are excellent. The latter has superior flavor. *Blackberry.*—Early Barnard is regarded as one of the very hardiest and best.

Apricot.—The Harris, a new apricot, is being successfully grown in some parts of Western New York.

As to which was the more profitable, the dwarf or standard pears, the majority seemed to prefer the dwarfs. The Worden grape is not likely to supersede the Concord. Fay's Prolific currant seemed to have given satisfaction except in regard to size. Professor Bailey said that the pear scab is caused by a fungus and recommended the use of ½ ounce hyposulphite of soda to 10 gallons water as a spray. $4,293.70 was reported as already raised on the permanent fund of the society. Mr. George Ellwanger gave the society $1,000, the proceeds of which are to be devoted to prizes. The following officers were elected: President, Patrick Barry, Rochester; Vice-Presidents, S. D. Willard, Geneva; W. C. Barry, Rochester; W. B. Smith, Syracuse; and J. S. Woodward, Lockport; Secretary and Treasurer, John Hall, Rochester. H. N. R.

POTATOES IN THE SOUTH.

VALUABLE DETAILS OF THE CULTURE OF EARLY POTATOES—"SECOND CROP" SEED.

ABOUT Memphis, the potatoes planted are Early Rose, Peerless, Early Ohio and Triumph. After several years trial, however, we find Triumph to be the earliest and most prolific potato, and one that will stand more uncongenial weather than any other. In fact, it has never failed. It yields large crops with exceedingly few unmarketable tubers, and it is the only potato that can be absolutely depended upon for a second crop.

We use for seed only those potatoes that are too small for market, and only our own home-grown second-crop seed. The value placed upon them is shown by the fact that the New York Early Rose potatoes could be bought last spring for $2.50 per barrel, while we sold our home-grown Triumph for $10 and $12 per barrel,

Any time from the first of January to March 15th, if our ground is in good order, we plant our seed potatoes. not tilled and drained like our more northern lands, hence we select land with as good natural drainage as possible. After breaking up the ground thoroughly with a two-horse plow, we harrow and "plank" or "plane" it. This plank or drag is made Λ-shaped, 10 feet wide and 6 feet long to point of the Λ, and the planks are put on like the weather-boarding of a house. This implement more thoroughly pulverizes the clods than a roller, which merely presses the clods unbroken into the soft ground. The ground is now laid off in furrows 3½ feet apart, making the furrows 8 or 10 inches wide and as shallow as possible. The fertilizer used here is cotton seed meal. Its action upon the potatoes is quicker than stable manure or any commercial fertilizer we have been able to obtain, and the potatoes are always smooth and clean. Eight hundred to one thousand five hundred pounds is used to the acre, but the more meal, the more potatoes. In distributing this meal, where machinery is not used, the men take a bucket of meal and scatter it thickly in the furrow, sacks of meal being put in different parts of the field for convenience. With a little experience, these men easily guess at the proper quantity.

Some cut their potatoes 10 or 12 days before planting rolling the pieces in dry earth which they have prepared under a shed, so as to "keep in the sap" and to "heal them up," as they term it. My own plan, however, is to have cutters at work the day of planting, and plant as fast as cut. I cut two eyes to a piece and put two pieces in a place, twelve inches apart. After having dropped the potatoes in the furrow on the top of the meal, I cover them by running between the furrows with a Planet Jr. horse hoe with the side shovels turned out, so as to throw about three or four inches of dirt on the potatoes. In this way, with one man and mule, six to eight acres a day can be covered.

The heavy work is now done. We wait until we see the potato sprouts breaking through the ground, when a one-horse V-harrow is dragged over the top of the ridges. This breaks the crust that has formed and gives the sprout a chance to come through. When the plant is up about six inches, I use a one-horse cultivator with the narrow 1¼ inch blade. These narrow blades enable me to run close up to the plant without disturbing the seed potato, at the same time relieving the work of hoeing weeds. After this the crop is left for a few days, when a little dirt is thrown up to the plant either with a turning plow or horse hoe. I prefer the latter. A week or ten days later, should the weather have been at all favorable, the final working, or as it is termed down here, "laying by," is given the crop. This is done by hilling as much dirt as necessary up to the plant. The Early Rose grows in a bunch directly under the root, while the Triumph spreads very much; hence a much wider furrow or bed is required for them than the Rose.

We now await results. About the first to tenth of June we commence harvesting the crop. The digging is done with a two-horse plow. No potato smaller than a duck's egg is used for market. The small potatoes are kept for seed purposes. The average yield, on good ground and with plenty of cotton seed meal, is 250 bushels per acre. The cost of production per barrel of 2¾ bushels, barrelled and headed up ready for market, is $1.25, and the average selling price is $2 to $2.25, while in many years $3 and $4 is obtained.

Thus far I have spoken only of what is termed our first crop. our second crop being by far the more valuable, it is grown entirely for seed purposed.

Tennessee JOE. L. ULLATHORNE.

FERTILIZERS FOR THE GARDEN—V.

FORTY YEARS' EXPERIENCE—FERTILIZER VALUES—THE ACTION OF NITRATES.

WE HAVE endeavored to show that, for economical use in the garden, many of the commercial fertilizers are too poor in nitrogen. In order to get the necessary amount of nitrogen, we are obliged to use far more phosphoric acid and potash than our plants need.

The practical deduction from these facts is, that we should (1) buy nitrogen, phosphoric acid and potash separately and do our own mixing, or (2) if we buy them mixed and ready for use, we should select those brands which, in addition to phosphoric acid and potash, contain *the highest percentage of nitrogen.*

As things now are, most gardeners will find it more convenient to buy their fertilizers ready mixed. And we may congratulate ourselves that, as a rule, our fertilizer manufacturers are giving us just what they promise us, and at rates which are not unreasonably high. If we do not get what we want, and thus waste our money, we have no one to blame but ourselves. If we want to put on an acre 50 lbs. of nitrogen, 30 lbs. phosphoric acid and 30 lbs. of potash, and buy a "complete fertilizer" guaranteed to contain 2 per cent of nitrogen, 10 per cent. phosporic acid and 4 per cent. potash, we should have to use, in order to get the 50 lbs. of nitrogen, 2,500 lbs. of the fertilizer. If we bought a fertilizer containing 4 per cent. nitrogen, and a proportionally less amount of phosphoric acid and potash, we should need to use only 1,250 lbs. in order to get the same results. If we bought a fertilizer containing 6 per cent. of nitrogen, and a proportionally less amount of phosphoric acid and potash, we should need to use only 833 lbs. of the fertilizer to produce just as much good as 2,500 lbs. of the fertilizer containing only 2 per cent. nitrogen.

There is this to be said, however, in favor of using fertilizers containing an excess of phosphoric acid and potash. If we use more nitrogen than we need, we run the risk of losing it by leaching the next winter, while if we use too much phosphoric acid and potash, they are converted into insoluble compounds in the soil and are not liable to wash away. Sooner or later they will become available for future crops.

Hence, a safe rule is to make sure of having sufficient phosphoric acid and potash in the soil, or in the manure, and then buy nitrogen at the cheapest rate and in the most available form. Practically, as things now are, this means buying the so-called "high grade" fertilizers, or fertilizers containing, besides phosphoric acid and potash, the highest percentage of nitrogen.

On our own farm, we do not use these high grade fertilizers. We buy a superphosphate which furnishes the greatest amount of soluble phosphoric acid at the cheapest rate. For potash, we depend principally on the store left from previous applications of barn-yard manure or from that supplied by the soil itself. On poor, sandy soil, we would furnish it in wood ashes or (cheaper still) in potash salts.

The nitrogen can be purchased in many forms, such as dried blood, sulphate of ammonia and nitrate of soda. Last spring nitrate of soda was very high. This spring, at the present time, it is lower than ever before. At the head of our article in the February number of THE AMERICAN GARDEN, the editor, probably in order to call more attention to it, wrote "FORTY YEARS' EXPERIENCE." It is true that we have been using commercial fertilizers for 45 years—commencing with Peruvian guano, then superphosphate, potash, soda, magnesia, sulphate of ammonia and finally nitrate of soda. But to-day we feel as keen an interest in the subject as ever, and are looking to our experiment stations for reliable information on many points not fully understood. And we were particularly pleased with the experiments of Prof. Bailey, of Cornell University, on tomatoes, and not less so with those of Prof. E. B. Voorhees, of the N. J. Experiment Station, an account of which is just received.

It was at one time thought that tomatoes required poor land—that if the land was rich the plants would run too much to vines and produce little fruit, and that little late. When ordinary stable manure is used there is some truth in this opinion—as there is in all opinions based on experience. The remarks we made last month * in regard to the importance of getting early growth and the difficulty of getting this early growth by the use of common manure without producing an injurious late growth, apply to tomatoes and probably to many other garden crops. At any rate, we have made the land for tomatoes rich with nitrate of soda and superphosphate, and have had dark-green leaves and luxuriant growth of vines without injury to productiveness or maturity.

Prof. Voorhees' experiments were admirably planned, and were carefully carried out by Mr. Housell, and clearly demonstrate that we can make land rich for tomatoes without injury and with decided profit. And, of course, when we say "make land rich," we mean the use of some manure or manures that furnish *nitrogen*. There is no way of making land rich for garden crops without using nitrogen. Both Prof. Bailey and Prof. Voorhees selected nitrate of soda as the source of nitrogen, and this was the fertilizer, in connection with superphosphate, used at Moreton Farm.

We have thus three independent experimenters, all of whom found decided advantage in using nitrate of soda on tomatoes. The principle here involved is of vast practical and theoretical importance.

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* AMERICAN GARDEN, February number, page 91.

Prof. Voorhees' experiments were made on the farm of Mr. C. M. Housell, Middlesex county, N. J. Mr. H. is an intelligent, practical market gardener, and the soil on which the experiments were made has been used for growing market garden produce for ten years, and is consequently in high condition. It consists of a sandy loam, is level, well drained and of uniform quality. Late in the fall of 1888 the land was sown with rye. In the spring of 1889 the rye was plowed under as a green manure. The manure and fertilizers were used May 7, and the tomato plants set out immediately afterwards, four feet apart each way. Details of the experiments are given in Bulletin 63, N. J. Ag. Ex. Station, New Brunswick. Some of the more important results are :

Manures and Fertilizers used per acre.	*Cost of Manures and Fertilizers per acre.*	*Value of crop per acre.*
No manure of any kind		$271 88
20 tons fine barn-yard manure . . .	$30 00	291 75
8 tons fine barn-yard manure and 400 lbs. complete fertilizer	15 00	317 63
160 lbs. nitrate of soda, alone	4 00	361 13

The above manures and fertilizers were all applied May 7. On an adjoining plot, 160 lbs. of nitrate of soda was sown May 7, and again, on June 12, when the tomatoes were beginning to set, another dressing of 160 lbs. nitrate of soda was sown on the surface around the plants. This plot produced a crop which sold for $369 per acre. The first dressing yielded a profit of $85.25 per acre ; the second dressing, a profit of only $3.87 per acre.

It is evident that 160 lbs. of nitrate of soda per acre was all that the plants needed, or could make use of without a greater supply of phosphoric acid and potash than the soil afforded. The 160 lbs. of nitrate contained 25 lbs. of nitrogen. This is as much nitrogen as would be furnished by 1,250 lbs. of a "complete fertilizer," containing 2 per cent. of nitrogen. In fact, however, the 160 lbs. of nitrate would furnish the plants, early in the season, more nitrogen than 1,250 lbs. of the "complete fertilizer" because it is in an available condition, whereas that in the complete fertilizer would have to be converted into nitrate before the plants could use it.

In addition to the above experiments, however, Professor Voorhees made others that are worthy of consideration. The results may be tabulated as under :

	Fertilizers per acre and when applied.	*Cost of Fertilizers.*	*Value of crop per acre.*
A	No manure		$271 88
B	160 lbs. muriate of potash and . 320 lbs. superphosphate . .	$7 20	$284 25
C	Same as B, with 160 lbs . . . . nitrate of soda, May 7	$11 20	$356 63
D	Same as C, with 160 lbs. additional nitrate of soda, sown June 12	$15 20	$429 38
E	Same as B, with 320 lbs. nitrate of soda, sown May 7	$15 20	$395 25

It will be seen that the addition of phosphates and potash to the 160 lbs. of nitrate of soda had no effect. The reason for this is that the soil could furnish enough phosphoric acid and potash for all that the crop produced by the 160 lbs. of nitrate required. *But* when an additional 160 lbs of nitrate of soda was used, then the phosphoric acid and potash came into play, and the crop brought $429.38 per acre.

It will be seen, furthermore, that the 320 pounds of nitrate applied May 7, on plot E, did not have as great an effect as the same amount of nitrate of soda applied at two dressings, on plot D.

Several reasons for this result may be given : First, 320 pounds of nitrate of soda is more than the tomatoes on this soil (already in good condition) could utilize. In no case did the second 160 lbs. of nitrate of soda produce as great an effect as the first 160 lbs. Second, the first application of nitrate was made May 7. On May 31st, a heavy wind and rain storm set in and continued four days. It is quite possible, therefore, that on this sandy loam the four days rain may have more than saturated the soil and carried the nitrate into the sub-soil beyond the immediate reach of the roots. The second dressing, therefore, June 12, after the rain had ceased and the tomatoes were beginning to set, furnished the additional nitrogen that the plants needed. Had there been a drouth at this time, instead of a four days rain, the results might have been precisely the opposite. In other words the one dressing at once might have been better than the same quantity applied twice. The second application during a drouth would have done little good. Third. It is quite probable that a too liberal application of nitrate of soda at the time of setting out the plants, especially if, as in these experiments, the nitrate was sown, not broadcast over all the land, but for a foot only on each side of the plants, may have induced a too luxuriant growth of vines ; whereas, if applied after the fruit was set it may have favored the growth and early maturity of the fruit.

Whatever the explanation, we take the liberty of thanking Professor Voorhees and Mr. Housell for their extremely interesting experiments, and of expressing the hope that many similar ones will be made, not only on tomatoes but on other fruits. If it is found that an early application of nitrate, in connection with other fertilizers, will produce a vigorous, healthy growth early in the season, and that this vigorous condition, with plants full of rich sap, has a tendency to ward off, or resist, or endure with comparative impunity, the attacks of insects and fungi ; while after the fruit is set and we no longer desire a growth of vine or wood, if it is found that a second application of nitrates will increase the growth, size and quality of the fruit, we shall enter on a new era in fruit-growing and gardening.

It may surprise many gardeners that 20 tons of fine barn-yard manure did not produce as large a crop of tomatoes as 160 lbs. of nitrate of soda. The 20 tons of manure contained not less than 160 lbs. of nitrogen, while the nitrate of soda contained only 25 lbs. And that the great effect produced by the nitrate of soda was due to the nitrogen, there is abundant evidence. Why then, did not the 160 lbs. of nitrogen in the manure do as much good as the 25 lbs. in the nitrate ? Simply because the nitrogen in the manure has to be converted into nitrate before the plant can use it.

Moreton Farm. JOSEPH HARRIS.

ONION NOTES.

THE WAYS IN WHICH ONIONS ARE PROPAGATED AND GROWN.

The soil best adapted to onions is a heavy, sandy loam, but a light clay loam will answer if it is well worked and does not pack or bake. Reclaimed swamp land is excellent if it is perfectly dry, thoroughly drained, and free from stones and roots; with proper manuring it will improve. Ground can be planted to onions without detriment for any length of time, if kept well manured. The average yield is 500 bushels or more per acre.

The requirements for successful onion culture are good seed, liberal use of manure, and thorough cultivation. Hen manure, bone, ashes, fish and guano, are particularly good, but they should be composted with plenty of good fine muck or leaf mould. Swamp muck may be used to good advantage, especially on heavy loam.

The red onions, either the globe or flat, are the most in demand, the easiest to cure, and will keep the best. There is a demand for the yellow sorts, but it is somewhat local. The white onions will always sell higher than the others if first-class; but they are uncertain.

To secure good seed, select the best onions, those which are firm, round, of good size and bright color, and which have not been frosted. As soon as frost is out of the ground in the spring the bed should be deeply and thoroughly harrowed down smooth; then lay out furrows three feet apart, and four inches deep. Set the onions in the furrows and cover by turning part of the dirt back on them. When the onions have started turn more soil over them until the furrows are filled up level. This method of planting gives the onion air, and allows it to secure firm hold in the ground. All weeds should be kept out to the end of the season, when the stalks begin to turn brown. When the seed pods begin to crack they should be cut off with five or six inches of stalk attached to them, and laid on the barn floor, leaving the doors open for a free circulation of air. The heads can be placed two or three inches deep. Turn them over daily until they are thoroughly dried, then thresh and clean them, put in coarse bags and hang up in a dry, airy place. The ground to be used must be as free as possible from foul seed, and weeds prevented from seeding.

For field onions, give the ground a good fall dressing of barn-yard manure that contains no foul seed. Plow it in deeply early in the spring, give a dressing of ashes or bone, and harrow the land both ways to pulverize the soil. Do not harrow over two inches deep, as the onion will bottom better than when deep cultivation is practiced. Then sow seed, making the rows twelve inches apart, and half an inch deep, and cover by drawing the back of a hand rake over the drills. When up so that the rows can be seen, go through with a hoe, loosen the top soil and kill the weeds; continue this constantly. When the tops begin to wilt and fall down, the onions should be pulled, and the tops cut off, leaving about one inch of top on the onion. Allow them to lay on the ground until cured or dry. When perfectly dry, if to be kept through the winter, put in heaps where there is a free circulation of air, and turn them frequently. Store in a cool, dry, airy place; as the weather becomes colder, cover them with straw. In case the onions freeze, do not disturb or move them until the frost has passed out; if kept too warm or damp they will decay.

For very early onions sets are used. They are often planted out in the early fall. To grow the sets prepare the ground the same as for seed onions, and sow the seed thickly, about one-half inch each way in small beds. The seed being too close together, lack of room preents the bulbs from growing large. Keep perfectly clean, and when the tops wilt they should be pulled and left several days to dry. Then put in a coarse sieve, shake the dirt from them, and spread out thinly in a cool place where the wind can blow over them. Turn them frequently. When dry, put in coarse bags, hang up in a dry place and keep as cool as possible without freezing. Leave the tops on till spring to prevent heating and sweating.

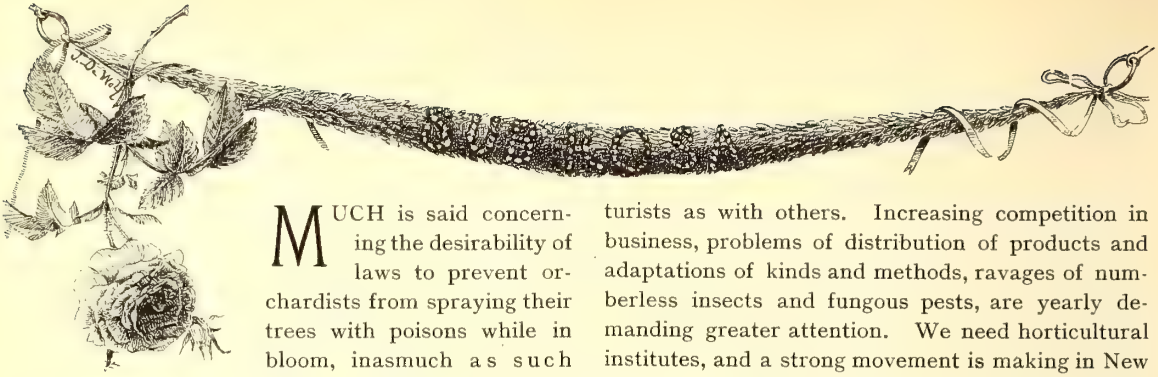
For planting out sets the ground is prepared the same as for seed onions, and is marked off in rows twelve inches apart. The sets are planted from two to four inches apart in the rows. Keep the ground loose.

Potato onions, or multipliers, are the earliest and hardiest of all onions, and they are the chief sort raised by truck growers in the south for early market. Prepare the ground as for seed onions, making the rows one foot apart and set the bulbs five or six inches apart in the row, setting so deep as to just cover them. Press the soil close to them. When they have started, loosen the soil by using a scuffle hoe. When the tops wilt or fall down, pull and top, leaving one inch of top on.

Top or tree onions are a sort which produces a large cluster of small onions on the top of the stalk. These small ones, when set, produce a large one so that it takes two seasons to grow a full-sized bulb. They are not grown for market, but mostly in gardens for home use. When the tops are ripe, cut them off, leaving plenty of stalk to tie in bunches and hang up to dry.

Rareripes are sprouted or medium sized onions set in garden beds for early use. They simply grow larger, and are soon fit to use. When the seed stalk has fully started and has begun to harden, break it down just below the bilge.

New York. S. B. CONOVER.



MUCH is said concerning the desirability of laws to prevent orchardists from spraying their trees with poisons while in bloom, inasmuch as such practice endangers the life of bees. The matter is urged with vehemence by the bee-keepers. It occurs to us that these persons are pursuing a course both impolitic and unnecessary. They should urge education rather than legislation. So far as we now know, there is no necessity for spraying trees when they are in bloom; in fact, there is certainly one reason that might be urged against the practice, besides the waste of time and labor—there is a possibility of interfering with pollination. There are very few growers who spray their trees while in bloom, and those who do spray at that time will at once change their practice if told that no good is to come from it. Our bee friends, we fear, have verily made a mountain of a mole-hill!

⁂

THE farmer's institute movement has been the strongest lever ever applied to the elevation of farming. It has spread slowly, but it has never lost an inch that it has once gained. The long period of trial, experiment and adaptation is past, and the movement is now extending itself everywhere in the full assurance of success. In some kinds of farming and in many places, it has transformed the whole atmosphere and practice of the farmer. Dairying, stock-farming and grain-growing have received the largest benefits, for the mass of farmers following these businesses have been densely ignorant. In fact, it appears as if these farmers have never looked upon their farming as a business, but as merely a means of subsistence. Farmers are now instructing farmers. The advice—once called theory—of professional men has become the practice of many.

Horticulturists, as a class, have had comparatively little benefit from the institute movemen This is due largely to the fact that fruit grow s and gardeners must know their business well in order to gain even a livelihood, and having known in a measure, they have not needed the enlighten-me institutes to so great an extent as some But times are changing with the horticulturists as with others. Increasing competition in business, problems of distribution of products and adaptations of kinds and methods, ravages of numberless insects and fungous pests, are yearly demanding greater attention. We need horticultural institutes, and a strong movement is making in New York to secure them for that state. Other branches of farm practice have been broadened and ennobled; why not horticulture?

⁂

THE crudest notions are still current in regard to the danger to human life from the use of arsenites upon fruit trees. It has been proved several times that no danger results from a discreet and careful use of the poison, and yet people talk about the absorption of the poison by the roots and even by the fruit itself. It must be borne in mind that only such materials as are in solution can enter plants, and that both Paris green and London purple are practically insoluble in water. And the plant also has a power of selection, by means of which it rejects many injurious substances. English growers have not yet adopted the practice of spraying fruit-trees, and among the English people in general there appear to be many crudities afloat concerning the matter. The following extract from correspondence of the London *Echo* is a sample:

> "When we remember that the skins of all fruits possess asmotic properties—the skin being simply a membrane or porous structure—the dangerous nature of the process will be seen at a glance. Even nuts absorb and suck up water, so that the shrivelled, dried-up kernel within swells out and again completely fills the shell. Should the practice spread, I fear that the use of the king of fruits may one day become as deadly as the thorn apple, which for years was said to be used at the incantations of the witches. But although the American growers have been cautioned against the dangerous nature of arsenic as an insecticide, the system continues to spread, so that to-day 75 per cent. of them use it in preference to any other. The purifying effects of all kinds of fruit acids and juices are proverbial, and it becomes all who are interested in an increased consumption of fruit to see that the products of English or foreign orchards are put before the public in good condition. I do not wish for a moment to blight the prospects of the American apple trade, but unless the system I have exposed is stopped the British public will do well not only to confine itself solely to English apples, but to all kinds of English fruit."

The comparison drawn between the shells of dried nuts and the skins of growing fruits is puerile. Experience and chemical analysis are worth more than fanciful exaggerations. There is no record that a person has ever been injured by eating fruit which was sprayed in its early stages.

* * *

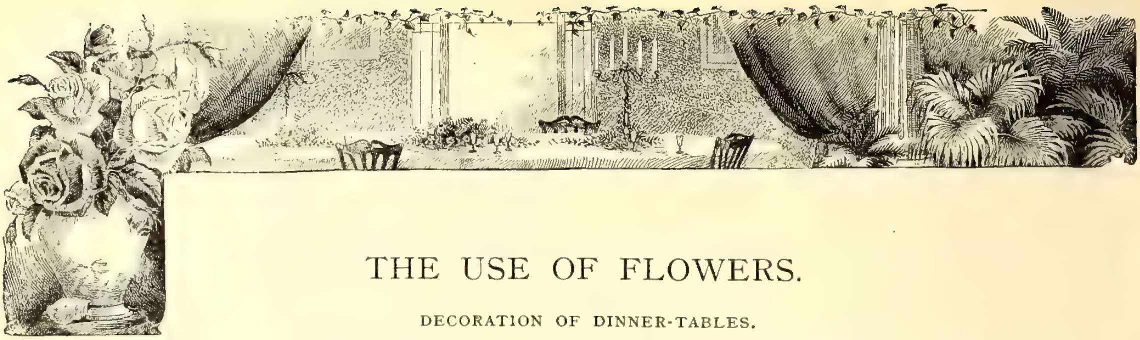
AGRICULTURE is more than tilling soil or raising produce. It is a factor in civilization. It does not take its place among the great factors in the evolution of the race simply because it furnishes food for the hungry, nor because it was Adam's occupation, nor again because it holds man naer to nature. It is great because of the reciprocal relations which exist between it and other great elements of civilization. Not only do other arts depend upon it, but it depends upon them. It is profoundly influenced by all the arts of life. Of recent years, transportation has overturned it. The farmer is fond of thinking that inasmuch as the food of the world comes from the soil, his occupation should be the first to thrive. But he is learning, fortunately, that agriculture can not dictate all things. The world owes no man a living until he earns it. So the study of agriculture is become two-fold. It is a study of particular methods of farming, and it is a study of the broadest principles of trade throughout the entire globe. It is a factor in political economy. It is in this dignity of view that our greatest educators are approaching agriculture. The inevitable laws of trade are teaching us that we must look for relief in cheaper and better products, not in higher prices. And it is significant that the only way to cheapen production is by the application of more labor and greater skill.

A man who possesses no particular knowledge of farming may still sweep the horizon of agriculture with the keenest vision, and he will discern failure and encouragement where they are least expected by the farmer. This boldness of view is admirably illustrated in the following extract from an address by President Adams of Cornell:

> "The processes of transportation have revolutionized agriculture. In past ages it was not uncommon for famine to sweep the land of half the people. It was not until this century that means were found for transplanting the superfluities of one country to cheaply supply the wants of another. It is only 100 years since improved roads were constructed in England. The steam engine, the steamship and the railroad are productions of the nineteenth century. Until 1870 it required 2,200 tons of coal to propel a steamship of 3,000 tons, leaving only 800 tons of freight capacity. In 1860 it cost $3.56 to transport a ton of freight a mile; now, with the introduction of Bessemer steel rails, the cost is reduced to an average rate of $\frac{86}{100}$ of a cent per ton per mile. The resources of southern Russia, India and Australia are made available in the same manner as our own. A laboring man can get a year's food for his family transported 1,000 miles for the price of one day's labor. It is no longer profitable for any farmer in eastern United States to farm in the old haphazard way. We must do as they are doing in the old world. In England crops have increased two-fold, in Germany three-fold during the century, while in the United States there has been a continual decrease in yield per acre year by year. The time will come when a reaction will set in. The call will then come to the farmers of the east to increase their production. There is a better time in the near future for the eastern farmer."

* * *

WHY wouldn't it be a good plan for the secretary of Agriculture to make a slight improvement on this "seed boodle" business by devoting at least a portion of the $100,000 appropriated "for new and rare seeds, plants, cuttings, etc.," *for plants* and *cuttings?* We understand that not a dollar is so expended nowadays. Why not, Mr. Secretary Rusk? You know well enough that a mighty small portion of this great amount—equal in effect to $2,000,000 set apart for this purpose at 5 per cent. interest—is actually used for "new and rare seeds," to say nothing of the plants and cuttings. By-the-way, we would like to see an exact statement of the goods that were really bought and sent during any one season, 1889-90 included. It would be mighty interesting reading to see whether our elevated Department of Agriculture is any improvement in this respect over the old agricultural bureau. We hope and suppose that it is; but with the keeping up of this free seed racket in ever increasing proportions, we think it would puzzle even so astute a novelty specialist as Uncle Jerry Rusk to find enough of "new and rare" seeds on which to expend that $100,000 every year. They don't come done up in that kind of packages, unless forsooth, he lays in a cargo of seed of some new cauliflower, for example. Seriously, the horticulturists, especially the pomologists of the country, are entitled to the consideration in the matter of "new and rare plants and cuttings" which it is provided by law should be theirs. New fruits and most ornamental trees and shrubs, etc., are better and more quickly and chiefly disseminated in this way than in any other, and many can be propagated true in no other way than by cuttings and similar methods. The United States Department of Agriculture in many cases might secure rare and valuable fruits, trees, etc., from remote countries, through our consuls, far more readily than any private importer. As a starter, Mr. Secretary, why not follow out Prof. J. L. Budd's suggestion in these columns, and send for the giant peaches of South Turkestan? And you will get *seeds* in this case, too!



THE USE OF FLOWERS.

DECORATION OF DINNER-TABLES.

We shall not pretend to entirely cover or exhaust at once this fashionable and fascinating department of decorative art, but hope, as the season advances, to suggest, by a few examples, how satisfactory results have been and may be obtained—now, by a design that has been employed on one of the ducal tables of Great Britain, and, again, by a picture of wild flowers gathered and arranged by an artistic American girl on some rustic dinner table. But why enumerate ? Better than all, if our friends will send to us photographs of artistic work with varied flowers from different sections of the country, then will our efforts have a greater interest than could be imparted by any other means. As in the case of all decorative work, the great effect depends upon the harmony of details ; but even these should be kept subordinate to the general scheme. But before going into particulars, let us take into consideration a few general principles that should be always regarded. In all decorations, fitness to place and occasion is important to success. Beauty and grace cannot be too prominent, but the attempt to increase them by crowding too many flowers upon a small space only gives an impression of vulgar ostentation. If we have roses in the profusion of Lucullus, let us not pile them up until they fall and smother our guests, as at the feast of Heliogobalus !

In giving consideration to the fitness of things, let us remember that a dinner differs from a banquet or entertainment on so large a scale that numerous tables or tables of great length are employed so that necessarily they are in great part beyond the immediate observation of any one guest. But let us consider a modern dinner where all the guests are seated, and let us not forget that politeness and humanity require us to give them the first consideration ; that the dinner is for them, not they for the dinner. Let us then avoid the use of flowers with strong odors, which are so liable to become oppressive and disagreeable to many when inhaled for any length of time, as some of the magnolias and lilies. Knowing the favorite flowers of any guest we delight to honor, it is sometimes a delicate attention to make them prominent. Among those who have given the subject their practical attention, it is universally conceded that for the sake of good form, the decorations in the center of the table should be kept so low as not to interfere with one's view of others, and give a sensation of hiding behind a floral hedge. We may then be spared the embarrassment of a hostess who was politely requested by an honest gentleman to have one of these elaborate structures removed to enable him to see the ladies opposite.

All the theories of color and principles of decorative design can be worked out upon our festive boards, and the result will add another pleasure for those able to understand the effect, but none of us need despair, for much of the most beautiful work has been done by those who never even heard the names of Chevruel or Dresser.

True beauty is not achieved by rare and expensive flowers alone ; just as beautiful are the leaves and flowers of forest and field and the product of our cottage gardens. The yellow and white of buttercups, or the common field daisies on a damask cloth, rival the beauty of golden orchids and allamandas. Roses, always beautiful, are sometimes tiresome to our society belles from their constant appearance on the table, and a person accustomed to their use and price can tell at a glance the cost of such a winter arrangement, and they sometimes make the pecuniary side of the entertainment undesirably prominent. After all, the daintiest, prettiest arrangement of roses for a dinner I ever saw, was composed of wild sweet-briers, perfect in their cup-like form and rosy-pink color, placed in a low plateau, filling the center of a large table and relieved by sprays of the pure white variety, the whole banked with abundance of their own fresh delicate foliage.

"Green dinners," in which Maiden-hair fern (*Adiantum cuneatum*) is alone used without flowers, have been justly popular, and nothing makes a prettier setting to the silver and china of the table service. In summer, just as effective work can be done with our native ferns, using plenty of the hardy native Maiden-hair (*A. pedatum*) if available. Lay some of the more delicate flat kinds directly on the white cloth, forming the outlines of any figure that may be admired, keeping the stems towards the middle of the table, and filling in towards the center with the light and feathery kinds, letting a few wave gracefully a little above the rest. Nothing makes a prettier bed for the base of a silver candelabrum, and the whole effect is cool and refreshing in hot weather.

Where plenty of flowers are available, a beautiful and graceful effect can be produced by making a mat of large, perfect leaves that will lie flat. Those of the tulip tree, sycamore and grape vine are useful, and during the summer the locust sends forth a fresh second growth, useful when other light feathery greens are hard to find. On this mat, with the buds projecting on the white cloth, lay dark, long-stemmed roses, or flowers of similar character, and they are most effective in couples, groups or bunches. Occasionally a red and a white one, with the white on an ivy leaf or some other dark background, are pleasing. The new red growth of tea rose leaves is good in this way, and enhances the pinks and yellows of the flowers. Keep all the stems towards the head or foot of the table as may be preferred, and add flowers and leaves until the whole space is covered, with every regard for the colors, but an easy, natural appearance in all. If the semblance to a large flat bouquet has been preserved, the stems at the end can, with good effect, be tied together with harmoniously colored ribbon, or a rustic effect may be preserved by using a few stalks of grain or some pretty vine. This disarrangement and distribution of the flowers among the guests just before the party leaves the table, makes an interesting feature on an informal occasion, and always gives pleasure and promotes good feeling. The flowers keep well enough without water, but all imperfect or disfigured leaves should be rejected, for suggestions of insects and decay are unpleasant at such times. NOEL CLINTON.

CULINARY GATHERINGS.

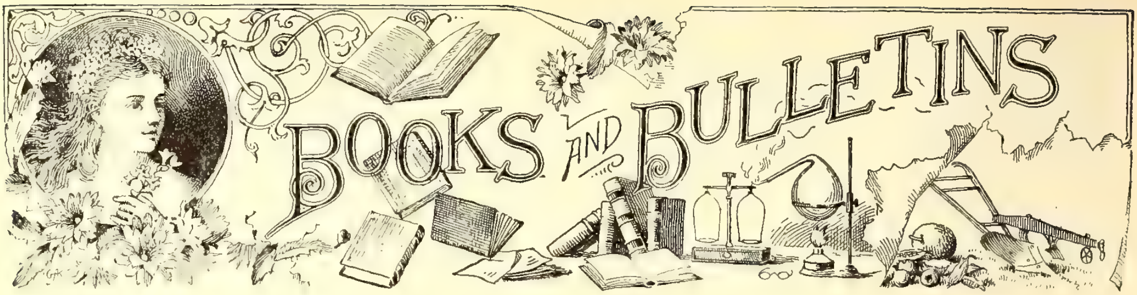
Quinces, Peaches and Cauliflowers.—*Quince preserves.* The quinces should be washed and wiped clean; then pare quarter and core them; weigh the fruit, and weigh an equal weight of white sugar. But do not boil them together now, as that would harden the quince, and here is the secret of this rich fruit being so often spoiled. Put two and a half pounds of prepared fruit in a preserve kettle with a quart of cold water, and let these boil a half hour; they will then be soft and eatable; then add a saltspoon of salt to keep them from breaking, two and a half pounds of sugar, and boil slowly one hour longer. Sweet or sour apples in quarters may be added. The sour will boil to a mash, while the sweet will keep whole. If all housekeepers had this recipe, the price of quinces would increase considerably.

Peach-paring Jelly.—AMERICAN GARDEN, October, 1889, page 359. If any one is sufficiently economical to save peach skins, the best and easiest way is first to wash the peaches and put them whole into a kettle with a little water, and either sugar or molasses enough to sweeten them. Boil till soft.

Cooking Cauliflower.—Cauliflower is a vegetable easily raised, and would be more generally used if it was better known. A dozen can be raised in a small space on the north side of a house. Soak them in salted water one hour to expel worms, and put into boiling water and boil thirty-five minutes. Serve with butter or white sauce.—BOSTON SUBURB.

Cooking Peaches.—In cooking the pits without shells, too much of the prussic acid contained in them naturally would be let into the preserve; but peaches cooked whole, either pared or not pared, are pleasantly flavored by this acid, and not enough comes out of the stone to do the least harm. No peach preserve is equal to that made of whole, pared peaches. To four quarts of them, add one cup of sugar and one cup of cold water. Boil slowly till soft, but not broken; or four quarts, as above, two teacups of molasses of best quality, one cup of cold water, and boil slowly till soft, but not broken. A pinch of salt will help to keep them whole, and improve them.

Oranges prepared for the fruit dish at dessert in the following manner have the double recommendation of looking pretty and being very easy to manipulate on one's plate. The skin is removed from the orange with the exception of a band about an inch wide around the middle. All the white inner skin is next carefully removed and the edges of the band of skin trimmed perfectly neat and straight. Then this girdle is cut in one place and the fruit pressed open to the center. Each section of the orange is separated from the adjoining one and when the work is complete the ends of the band are brought together and the fruit put into its place on the dish, where it appears as round and firm as ever, until subsequent investigation on the individual dessert plate disclose a number of tiny pieces joined only by the ribbon of rind.



BOOKS AND BULLETINS

Gray's Botany Revised.

Gray's Manual of the Botany of the Northern United States. *Sixth edition, revised and extended westward to the 100th meridian. By Sereno Watson, Harvard University, and John M. Coulter, Wabash College, assisted by Specialists in certain groups. Ivison, Blakeman & Co. Pp. 760.* Botanists have waited long for the revision of Gray's Manual. The fifth edition was prepared in 1867, since which time there has been remarkable activity among collectors, and a considerable introduction of European species has taken place. The new edition, now that it has come, is better for the delay, for it is an epitome of prolonged labor in almost every department of our varied flora. In the main, the new edition adheres to the style of previous ones, although a few innovations have been made; but all the essential and important features of the last edition have been maintained, and the new ones are decided improvements. The introduced species have been set in different type from the body of the work, and they are not numbered under the genus. They now strike the eye at once, presenting a graphic representation of the proportion which they bear to the native flora, and affording some aid to the student in analysis.

New Species.

A comparison of this edition with previous ones affords some interesting data of the migrations of plants. In twenty years, not only have many species new to the territory come in from foreign countries, but what is more interesting, several species of the western states have spread eastward. A noticeable feature in such comparison, also, is the large number of high northern plants which have been discovered in recent years inside our northern borders. Some of these have been but recently discovered on the American continent. This fact, and the large number of wholly new species which have been described from our territory in the last twenty years, indicates that field botany is still but imperfectly known, even in the oldest portion of our country.

Several specialists have contributed to the volume in certain critical groups. M. S. Bebb has elaborated the willows, Professor D. C. Eaton the ferns, and Professor L. H. Bailey the sedges. The Hepaticæ, or liverworts, have been included, this portion being contributed by Professor L. M. Underwood.

The range of the volume has been extended westward to meet the eastern limit of Coulter's Manual of Rocky Mountain Botany.

Wood's Lessons in Botany.

Wood's Lessons in Botany. *Revised and edited by Oliver R. Willis. A. S. Barnes & Co., N. Y. Illustrated. Pp. 220.* Professor Wood's books have all been useful and popular, and the present treatise, which appeared originally as a part of the *Botanist and Florist*, has been, perhaps, the most useful of his writings. The matter is suited to a large class of elementary students, and the treatment is singularly clear and concise. This treatise was written more than twenty years ago, since which time both the science of botany, and methods of teaching it have been largely revolutionized. Professor Willis has separated and modernized it, and the result is a most attractive addition to our small list of good botanical text books. The chapters comprising the results of microscopical research have been entirely rewritten, and many other parts of the work have been recast; and although the book is essentially a new one, all the particular features of the original have been maintained. The little volume is admirably adapted to youth and adults who are beginning the study of botany. The publishers have exercised great taste, making one of the most attractive text books ever issued.

Economic Fungi.

Economic Fungi. *A series of Specimens designed chiefly to Illustrate the Fungous Diseases of Useful and Noxious plants. Fascicle I. Nos 1–50. Edited and published by A. B. Seymour and F. S. Earle.* This is the first distribution of fungi in this country designed for the particular purpose of illustrating and elucidating plant diseases. The present fascicle is concerned mostly with diseases of plants of the rose and vine families. Grape mildews, plum-pockets, leaf curl, peach and plum rot, strawberry rust, blackberry rust, apple scab, rose diseases and tomato blight, are among the diseases represented. The fascicle is neatly made, and the reputation of the authors for accuracy makes the distribution invaluable for those having much to do with plant diseases.

Grape Growing: *A simple Treatise on the Single Pole System, or How Grapes are Cultivated in the Upper Rhine Valley. By A. N. Hofer, McGregor, Iowa. Pp. 32.* This little volume comes from the pen of a grower who practices that of which he writes. This system of training to a single pole has been presented many times, but this is one of the few instances in which the describer has actually practiced the method to a commercial extent in America. The essence of the whole system is the securing of many roots and a small top, and the result cannot be otherwise than good; but whether the method will pay in the average vineyard is a question. For amateur cultivation, the method is certainly among the best.

The Single Pole System.

The book has common faults of composition, but the essential points are for the most part clearly made. A most interesting and amusing feature, for this day, is a long discussion of the influences of the planets upon grape culture. This feature possesses some value inasmuch as it is a record of superstitions of the Rhine, but it is singular to read of them as applied to America; one thinks himself a century or two younger.

Grape Culture in the South.

BULLETIN NO. 10, ALABAMA EXPERIMENT STATION. *Grape Culture. By J. S. Newman.* "In order to satisfy the skeptics who did not believe grapes could be grown successfully on this soil, a most unprepossessing north hill side, of what was known as 'worn out' land, was selected for a vineyard. The remark was often heard, 'If you can grow grapes there they will grow anywhere.' Three large gullies, from three to four feet deep and from six to ten feet wide, extended through a part of the acre selected for the experiment vineyard, and from another portion the soil had been so completely washed off that the surface was entirely bare of vegetation." The experiment has proved that grapes can be grown profitably in the South, even upon worn land. Good notes of varieties are made. The following are the most important kinds mentioned: *Berckmans*, "a very promising new variety, the grapes nearly as good as the Delaware and the vine much more vigorous;" *Concord*, "one of the most reliable standard varieties, which succeeds under conditions fatal to many others;" *Elk Eagle*, "the best black grape in the list—bunches so long that 6-lb. bags were required to cover them—desirable for amateur culture only;" *Goethe*, "desirable on account of ripening late and superior quality—valuable for local market and amateur culture;" *Ives*, "one of the standard varieties for market and wine, though not of first quality; the Ives should have a place in every vineyard;" *Moore's Early*, "takes place of Hartford Prolific on account of better shipping qualities and less liability to rot, best early black market variety;" *Niagara*, "promises to become a standard white market variety;" *Perkins*, "one of the standard hardy and reliable varieties, very showy and sells well—ripe with Moore's Early, but more attractive and sells better;" *Worden*, "so nearly like the Concord, with less merit, there seems to be no room for it;" *Wyoming Red*, "by far the best early grape for market and table use." For amateur culture, the following are mentioned: *Beauty*, *Brighton*, *Catawba*, *Duchess*, *Eldorado*, *Elk Eagle*, *Irving*, *Jefferson*, *Lady Washington*, *Lindley*, *Martha*, *Mason's Renting*, *Maxatawney*, *Prentiss*, *Triumph*, *Vergennes*, *Wilder*.

The Muscadines.

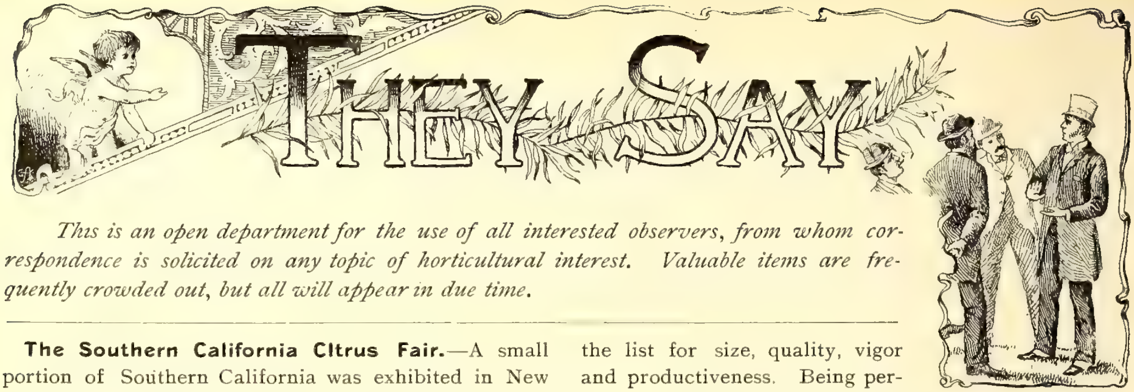
The Muscadine or Scuppernong class has been the subject of experiment. These varieties are not commonly trained and pruned systematically, but Mr. Newman finds they are greatly improved by thorough treatment in these respects. "The vines of this class must be pruned as promply as practicable after the leaves fall. If delayed until winter they will bleed severely and often cause death. The vines are trained upon wire trellis, which has four instead of two wires, as for the other types. The laterals are spurred back in a manner somewhat similar to that used on other types. While vines of this type propagate readily by layers—the usual method—we have succeeded nearly as well with cuttings as with other types, better than with the Norton."

BULLETIN NO. 7, HATCH EXPERIMENT STATION OF MASSACHUSETTS. A portion of this bulletin, by S. T. Maynard, is devoted to horticultural matters. Many tests of fruits and vegetables are reported, but the results are expressed almost wholly in figures, from which it is unsafe to draw statements of general relative merits of varieties, A brief summary of a table, or a succinct statement concerning the general merits of each sort, is desirable, even when tables are well made, as here.

Girdling the Vine.

Dr. Jabez Fisher, under Professor Maynard's directions, has made trials in girdling the grape vine to hasten maturity. Dr. Fisher remarks as follows concerning his trials: "July 5, I girdled one of the two bearing arms on each of sixty Concord grape vines by taking out a ring of bark half an inch long near the trunk of the vine. As a result these grapes showed color August 12, six days before those on the opposite half of the same vines. They were fit for market September 20, the berries being then from 30 per cent. to 40 per cent. larger and much sweeter than the others. October 1 they still were sweeter than those not treated, which latter were then ripe, but the first had a somewhat insipid taste without the refreshing sparkle of the others. * * * The results, so far as they are apparent from this trial, show a gain of ten days in fitness for market, with largely increased size of berries. The drawbacks are, in a season as wet as the past, a loss of from 20 per cent. to 40 per cent. of the berries by cracking open, and the production of berries too soft to bear carriage. Both of these drawbacks would be lessened in a drier season, though not overcome in my experience, and there would be a decided diminution in quality for connoisseurs. Add to this the harm which may come to the vine from the operation repeated year after year, but which is not yet settled." Chemical analyses made by Dr. Goessmann show more sugar in fruit from girdled vines than from others. Professor Maynard draws the following general conclusions: "It will be seen by this report, as in our previous reports, that there is a decided gain in the time of ripening of the fruit, which will enable us to grow many late varieties not possible without it; that a gain of ten days would make a great difference in the price of the fruit; that there is no loss of sugar, and the increased size of the fruit would make it very attractive and more than make up for the softness of the berry. This latter condition can be of little objection, as most of the grapes of New England are sold in local markets."

THEY SAY



This is an open department for the use of all interested observers, from whom correspondence is solicited on any topic of horticultural interest. Valuable items are frequently crowded out, but all will appear in due time.

The Southern California Citrus Fair.—A small portion of Southern California was exhibited in New York last month. The hall was transformed into a miniature orange grove, rows of orange trees bearing the luscious golden globes being flanked by mounds, boxes and baskets of oranges, lemons, limes and pomelos, interspersed with a profusion of fruits, flowers, shrubs, canned and evaporated fruits, raisins, specimens of native woods, etc. The hall was beautifully decorated with spreading palms, graceful pampas plumes and specimens of different plants indigenous to Southern California. A giant cactus, 20 feet in height and weighing nearly a ton, was a feature which attracted much attention, as it towered a column of living green in the center of the hall. There were numerous specimens of different varieties of cacti; different species of yuccas, pine-palms and other interesting plants. The display of vegetables was small, including a few mammoth squashes, pumpkins, beets and potatoes, but showing by the huge proportions of these the possibilities of the soil and climate. The chief interest, however, centered in the display of citrus fruits, of which there were said to be more than 100,000, oranges being in greatest profusion. The latter were noticeable for their bright, clear, golden color, being remarkably smooth and free from imperfections. There were some remarkably large specimens of the seedless Riverside Washington Navel, though some of the smaller varieties were said to be finer grained and of better quality. There were numerous citrons, which very much resemble in color and general appearance an enormous lemon. Several bottles of olive oil of fine appearance denote a very profitable industry in the culture of the olive, which thrives remarkably in the more arid portions of the state. The display of raisins was large and fine, embracing several brands, including the Sultana Seedless. Another product of the grape was exhibited everywhere in the shape of innumerable bottles of wine of fine appearance, but unapproachable farther. The whole display was tastefully arranged, and was a wonderful exhibition of the capabilities of a vast "desert" when brought under the influences of irrigation.—VAL.

Wisconsin Strawberry Notes.—The unfavorable frosts of last May hardly gave us a successful year for strawberries, yet the comparative merits of the new varieties may be relied upon:

Jessie.—As this is the home of the Jessie, we are gratified to be able to report that it stands at the head of the list for size, quality, vigor and productiveness. Being perfect in blossom, it is a good pollinizer. On some soils there are unfavorable reports, and from other sources the evil comes from spurious and mixed plants.

Bubach No. 5 is the best large pistillate berry, and is a splendid accompaniment to the Jessie for fancy and profit. I know of none better for near market.

Warfield No. 2 stands at the head of the pistillate varieties for productiveness, beauty and best shipping qualities. It is even more firm than Wilson, and the two varieties may be picked and shipped in the same crate. It is equally as productive as Crescent.

Haverland is a splendid variety, a great bearer and stands side by side for vigor, productiveness and profit with Bubach among the pistillates. Now we want a mate for it of the same shape, size and color, so that they can be planted side by side and marketed together. I know of nothing yet introduced better than Jessie to plant with it. This also needs a near market.

The productiveness of Jessie and Bubach may be illustrated by the following measurements: After the beds had been picked six times, I marked a few plants. July 1st I cut 11 Jessie from one stem whose added circumference was 33⅝ inches; another with 9 berries measured 30¼ inches. One stem of Bubach, 11 berries, measured 35⅝ inches, another of 8 berries 25¾ inches. These were four out of fourteen stems measured, with but little variation, and all picked from matted rows where plants were dug very close; if plants were grown in hills and given nice attention more than double these figures would have been reached.

From my experience with 100 varieties of strawberries, I would class the principal ones as follows: Wilson and Warfield No. 2 for shipping and canning, Jessie and Bubach No. 5 for home use and near market, Jessie and Haverland for home use and near market, Jessie and Crescent for home use and near market. Wilson, Miner, Capt. Jack and Mt. Vernon are all good for fertilizing. Two rows of these and four of the pistillates may be successfully grown, but pistillates will bear better if every other plant in the same row is perfect-flowering. We have many new varieties on trial which we will report on in due time. Gandy and Lida are late, but not productive. We plant in long rows two rows of perfect-flowering kinds and two rows of pistillates; plants set 3 feet by 1 foot, and kept in narrow matted rows, mulched with marsh hay in November, and do not remove the mulch in the spring.—Geo. J. Kellogg, *Wisconsin.*

Japanese Wineberry.—This new comer in the list of small fruits is a decided novelty in many ways. It is entirely distinct from any other raspberry, the class to which it belongs, in having the fruit covered by the calyx until nearly or quite ripe; in its immense clusters, and in the whole plant being covered with a reddish-brown hair or moss. Before the calyx opens, displaying the fruit, it appears like the crested moss-rose bud. The fruit is one of the handsomest of the berry family the color being almost indescribable, having the intensity of a flower rather than of a fruit. In flavor, the fruit is not superior to that of our native sorts, but the beauty of the plant when in fruit, and its being perfectly hardy, makes it desirable. Whether the fruit has the astringency peculiar to most Japanese raspberries, we cannot say, not having sufficient opportunity to test it.—C. L. Allen.

Mexican Tree Bean.—In the list of new vegetables for the year we notice this bean, but cannot vouch for its goodness as a vegetable, but must say the plant is worth growing for the beauty of its pods, which are more than a foot long, containing a dozen or more beans, which are quite large and pure white. The name has been used before for a branching "Navy."—Queens.

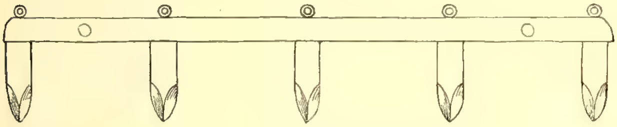


FIG. I. HEAD OF GARDEN MARKER.

A Home-made Garden Marker. For the beam or head (Fig. 1) I use 1½x2 in., and 4 ft. 2 in. long, plowing a groove ½x½ in. in the lower side. I then bore ½-in. holes every 2 in., beginning 2 in. from the end. The teeth (Fig. 2) are made of oak, from a stick like the beam, with a tenon 2 in. wide by ½ in. high and ⅜ in. long. Two inches below this tenon or shoulder, I mortise in a nut to take the joint-bolt, which is inserted through the beam to hold the tooth. This joint-bolt (Fig. 3) is 5 in. long, ⅜ in. diameter, and pointed, with a thread turned on the lower end. The hole in which this bolt lies should be ½ in., to allow of easy transference. The lower end of the tooth is sharpened somewhat like a double mould plow. For handles I use two rake handles about 5 ft. long, which are fastened in the head between the bolt holes. The teeth can be adjusted to any distance in a very short time, and the implement is a useful and durable one. The rings on the top of the joint-bolt allow it to be turned with a stick when a wrench is not handy.—John Jeannin, Jr.

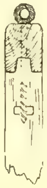


FIG. 2.

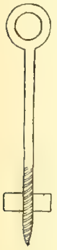


FIG. 3.

Some Persons May Think that *flowers* are things of no *use;* that they are *nonsensical* things. The same may be, and, perhaps, with more reason, said of pictures. An Italian, while he gives his fortune for a picture, will laugh to scorn a Hollander, who leaves a tulip-root as a fortune to his son. For my part, as a thing to keep and not to see; as a thing the possession of which is to give me pleasure, I hesitate not for a moment to prefer the plant of a fine carnation to a gold watch set with diamonds.—William Cobbett.

The First Tree of the new Idaho pear in Rhode Island was, through the good offices of J. E. Lester, Esq., planted upon the grounds of the experiment station at Kingston, R. I.

Nursery Stock vs. Wild Plants.—Many of the native plants offered by dealers do not appear to be grown in the nursery. In some cases the demand is so limited that it does not pay grow them, especially when they grow wild near at hand. In other cases, on the contrary, the demand is sometimes so great that sufficient stock can not be kept under culture readily, particularly in those cases in which the demand is somewhat uncertain. But there are other plants for which there is a steady demand which are still dug in the woods by some nurserymen. These wild plants are nearly always poorer than the nursery-grown specimens, being old, rough, and untidy. Never having been cultivated or transplanted, they are not so apt to live. Then they are bulky and make excessive freight charges. We recently ordered so common a plant as *Clethra alnifolia* from a reputable firm, but got wild plants, good ones to be sure, but the express, although the distance was comparatively short, amounted to more than the plants were worth. We believe in nursery-grown stock.

Floral Decoration for the Table.—One of the prettiest fancies recently noticed was used at a large London dinner. It was a large cornucopia of yellow pompon chrysanthemums, laid flat and close together, while a profusion of beautiful white flowers were wired, and stood up above the cornucopia at the top as though they were the contents of the holder. The same idea carried out in pale pink and white carnations with a few long sprays of smilax would be equally pretty and effective. Another handsome dinner table ornament is a large mirror laid in the center of the table with pond lilies resting upon it. A dish of moss, ferns and English violets also forms an unobtrusively elegant flat center piece. Shallow bowls of cut glass filled with long-stemmed rose-buds of white and pale yellow tints are conventional but extremely tasteful; other pretty combinations can be made also.

The Rood Plum is attracting considerable attention in some parts of Central New York. It is larger than Lombard, much better in flavor, and the tree is productive and hardy. The fruit is wine-colored. The variety originated some years ago at South Cortland, N. Y.

Fruit Notes from Washington and the Columbia.—*Where Grapes* (*Vitis vinifera*) *Succeed.*—Upon my way to Puget Sound, I tarried sometime in the Columbia valley. It did not take long to discover here a rival to California. In some important respects this region appears to be a superior wine-producing country. There are serious climatic obstacles to be overcome in fermentation in California that do not appear in the Columbia valley, because the climate in the latter region is so much cooler that the sucrose stage may be maintained long enough to develop superior qualities, flavor and bouquet, before running into the acetic stage. As I studied the matter I discovered that I was becoming musically inclined; my song was "Hail Columbia, Land of the Vine." My mind, seizing the varied phases of the problem, carried me in imagination to that other great river, the Rhine, where for a thousand years romance, song and story have been associated with its vine-clad hills, where the finest wine of the world has so long been produced. If I should dare to allow myself to prophesy, I should predict great things in store for this favored region.

The Columbia river is much larger than the Rhine and the valley many times larger than the Rhine valley wherein the conditions for grape culture are present. There is but a narrow strip along the immediate shores of the Rhine where grapes may be grown, but here in this valley of the Columbia the climatic conditions are favorable wherever water for irrigation can be carried; indeed, large portions of the valley do not require irrigation. California may, and indeed, probably will, have a monopoly of raisin production. The heat there is sufficient to dry raisins out of doors, and there is also more glucose or grape sugar produced in a hot than in a mild climate, but there are more flavoring extracts and bouquet in the grapes grown in a mild climate than in a hot one. The valley of the Columbia has been at no very remote period the bed of a lake, but it is now filled with the output of one or more volcanoes, and much volcanic ashes containing potash is distributed over these lands, thus making the soil more like the grape districts of Europe than those of California. I found upon inquiry that here and there men are abandoning wheat culture and going into that of grapes. The same facts had been so often observed by others that they are forcibly impressed upon my mind. The climate of western Washington is too damp for *Vitis vinifera;* the leaf mildews and the fruit fails to ripen, but the Columbia valley, east of the Cascades, should in the near future become the paradise of the vintner.

The Pear in Oregon and Washington.—Pear trees have been cultivated in these states for forty years, but until the last few years there has been no market. The trees have been much neglected and allowed to overbear. The bud development is so stimulated by the climatic conditions that the trees begin to bear when two or three years old. The usual result follows: By the time the trees ought to be at their best, they look old and decrepit. The few trees observed that had been fairly treated looked healthy and bid fair to be serviceable for many years to come. Some of the fruit shown me was as fair and as finely developed as the best California specimens, while the flavor and quality were better. Pear culture here seems to have a future before it.

Peach Culture in Washington.—The peach requires a warmer summer climate for its highest development than is usually found in the Puget Sound country. It is, however, grown and does well at various places, especially in the low regions of the Columbia valley. With care, it may be grown in protected situations, such as is afforded by buildings and other shelter. The foggy mornings along the shores and inlets afford protection to their floral organs early in spring.

Plum Culture in Washington.—This bids fair to become one of the most profitable industries here. The world wants prunes, and the very finest prunes are grown here already. The trees flourish both east and west of the Cascades, but seem favored more in the moister western sections.

Cherries and Small Fruits.—There can be no finer cherries than those so plentifully grown here. One gentleman exhibited to me limbs of cherries, grown at Tacoma, that appeared almost a solid mass of fruit as large around as a man's thigh. I have never seen in any county such a luxuriant growth of these trees. I did not see any apricots, but they are said to do much better than elsewhere, being never interfered with by insects. I saw rows of blackberry bushes from ten to fifteen feet high, but was too late to see the fruit. Currant bushes were not so vigorous, but strawberries, at the first of April, were already giving promise of heavy crops. They are here, especially favored by the moist climate, no fruit requiring so much rain for its highest development.—D. S. MARVIN, *Tacoma, W.*

Dwarf or Standard Pears? Questions as to the superiority of dwarf or standard pears are always asked, but never answered. Circumstances alter cases. The man who gives only ordinary care and culture to his trees, or who has indifferent soil, better grow standards. But the man who will give his orchard extra care and attention, and who has good strong loam, will make more money with dwarfs. The essential points in dwarf pear culture are these: Varieties which thrive well upon the quince, good culture and timely attention always, rich soil, cutting back a large part of each year's growth.

Watermelon Syrup.—Until quite lately, the watermelon has been the legitimate prey of the small boy and the mainstay of the doctors. But times are changing, and a splendid syrup is now being made from it. The syrup is made by chopping up the melons and squeezing or pressing out the juice (about a quart being taken from a fair-sized melon). After boiling the juice rapidly for several hours the red coloring matter coagulates, rises to the surface and is skimmed off in the form of a foam, leaving the juice as clear as distilled water, and of a pale amber color. Boiled a little longer, it thickens into a rich, fruity-flavored syrup, perfectly clear and the color of quince or apple jelly.—*California Fruit Grower.*

The Dwarf Orange.—What is known in the trade as the Otaheite orange is a charming plant for pot culture in the conservatory or window-garden. In a two-inch pot, it will flower most profusely and ripen its fruit. Orange blossoms are ever desirable, and when from twenty to thirty can be had on a plant not more than six inches high, and growing in a two-inch pot, there is no reason why they should not be found in every window.

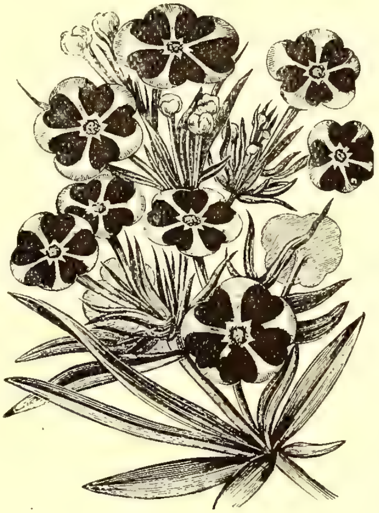
Roses at Kew.—In the article on Kew there is no mention of the grand collection of roses to be seen there. I went there in the latter end of last June, just when they were in all their glory. No one can describe my feelings on first seeing them. All the old favorites were there and a great many new ones. I wandered round and round the beds containing them and felt almost like worshiping them. There were a great number of standards, as well as dwarfs, all alike for health, vigorous growth and bloom. I noticed that the beds were all heavily mulched with fresh cow manure. After leaving Kew, I went direct to Paris, France, and saw perhaps the finest exhibition of plants and flowers in the world. There were thousands of roses on exhibition, by all the leading growers of France; but the bloom was nothing to compare with the display at Kew. The beds there were also heavily mulched, but with old rotten manure. There was a grand display of evergreens and coniferous plants, and also of clematis, orchids, etc. This was in the Trocadero park, of Paris, which formed a part of the great exhibition. I also noticed at nearly all the railway stations in Kent, along the platforms, great rose bushes covered with beautiful flowers.—JOHN WHITHAM, *Ontario.*

Do Catalogues Pay?—While writing to-day, a lady of more than ordinary observation, asked: "Do these expensive catalogues pay? The same things over and over again; and as for the new things, they are so frequently not as represented, that I pay but little attention to them. Why don't the seedsmen get up something that will tell us how to manage our garden, how to get the most and best for the least money; and then, too, if they would tell people the various uses of vegetables, and how to cook them, a good work would be done."

This is my opinion to the letter. The catalogue of the day is not the publication wanted; it is the old, old story, cheaply displayed, and not half told. Give us a plain list of vegetables, fruits and flowers, unadorned with high colors and illustrations of things we have known for years, but full of information as to methods of culture, and how best to prepare and cook the vegetables after we get them. There are hundreds of ways of cooking vegetables that the masses know nothing about. Tell people all about these things, and they will not only read the catalogue, but buy liberally of what is offered.—C. L. A.

Solanum Jasminoides, var. grandiflorum, is just what its name implies, a grand flowering plant; in the much desired class of trellis plants it has no rival, growing freely, and producing immense panicles of pure white flowers, with a slight tinge of purple on the bud and on the back of the petals. It thrives well as a pot plant, flowering freely in winter, and can be trained into any desired shape or form. Its greatest use, however, is as a trellis plant, growing freely, its bright green foliage contrasting beautifully with its matchless trusses of white flowers.

Arnebia Cornuta.—The Continental European novelty that seems to be attracting the most attention just now is the *Arnebia cornuta*, in course of distribution by Ernst Benary, of Erfurt, Germany. It is the first annual species of this genus. The plants reach a height of two feet, are much branched, and furnished with linear, oblong leaves. The curious flowers expand daily in succession, and are produced in great profusion on the numerous branches. They are about the size of a quarter of a dollar; of a rich yellow, marked with five spots nearly black, the first day of opening, turning to maroon on the second and vanishing on the third day, leaving the flower a clear yellow. It is said to bloom with unusual freedom, and the flowers retain their freshness well when cut and placed in water. Although a novelty in cultivation, it was described many years ago by Ledebour. It is curiously distributed by nature, being found in Siberia, south-eastern Russia, Algeria and Tunis.



Manettia Cordifolia.—Few plants of recent introduction are as valuable as this, from the fact of its always being in bloom. It is a growing climber, that is delicate, so far as foliage and flowers are concerned, but a vigorous grower and persistent bloomer. In the open border it will flower the entire summer; in pots in the house the entire season. Its flowers are small, brilliant scarlet, tipped with yellow; their immense number, ever present on a well-grown plant, is very attractive. Being a native of Brazil, it requires an abundance of heat and light.

Glue for Window Plants.—Window plants will bear abundant flowers by putting common glue into the pots. Press a small piece of glue here and there in the pot, an inch or more under the surface, as the decomposition otherwise would be offensive, and injurious to the health of the household.—S. B. D.

"Florist's Flowers."—This is a term often used by foreign floricultural writers, and one we are frequently asked to define. They are flowers with established characters or habits, and such as can be propagated by cuttings or division of roots or tubers. The term is generally applied to greenhouse and hardy plants that have been produced by hybridization and selection. When a cross between species has been secured, an innumerable number of varieties will be the result; some of these are desirable, and can only be retained by cuttings, as seedlings of any variety are not constant. This is particularly the case with the verbena. If we saw the seeds from any desired plant, for instance a scarlet with a white eye, there is no probability that we should get one plant in a hundred like the parent, and in a hundred plants we could not get two precisely alike. Therefore, to reproduce these varieties we must propagate by cuttings, which is the work of the florist; hence, the name "florist's flowers," in distinction from such as are grown from seed. The term is also applicable to such as the gladiolus and the hyacinth, which, when propagated from the small bulblets that form at the base of the old bulb, will reproduce the variety, but never when grown from seed.—QUEENS.

Recuperative Power of Trees.—A very large holly, or rather clump of hollies, grew upon the edge of a marsh on the Rappahannock river. The very high tides and heavy rains of the past year so loosened the roots in the soft, yielding soil that the tree fell over and lay quite prostrate upon its side. While lying there it continued to live, but its weight drove some of its boughs several inches in the earth. Here these broken stumps of branches plowed furrows in the earth from the action of the wind, and became encrusted with earth dug from these furrows. Having occasion recently to pass the tree, I was surprised to find that the entire tree had righted itself several feet and resumed almost its former position. The fact was evident, as there still remained the furrows which the broken limbs had plowed and the limbs themselves were still coated with the earth which had been excavated, but they had risen so much from the earth that they could not be brought back into the furrows again even by a strong exertion. I never heard of such an instance as this restoration to its former position of so large a tree as this holly, which must have been quite ten or twelve inches in diameter, and fully thirty feet tall.—P. S. HUNTER, *Essex County, Va.*

Abandoned Farms.—Do city people know where some of the abandoned farms in New Hampshire are located, which the State is trying to people with foreigners? Some are reported in the town of Jackson, which is near the heart of the mountains, and the grandest scenery in New England. Jackson is beyond North Conway, not far from Tuckerman's ravine, the Glen House, the Crawford House, and probably the nearest point to the largest mountains where land could be bought at any price. Much of the scenery that has been credited by artists to North Conway, is in the town of Jackson and vicinity. Why not buy a delightful summer home? This land will be priceless some day.—BOSTON SUBURB.

A Good Planer for Soft Ground.—It is eight feet long and four feet wide, made of two-inch plank, with a hard-wood cleat three inches wide and an inch thick on the bottom. The planks are nailed firmly to two pieces of timber, one end of each piece of timber being cut at such an angle that the plank nailed to it is slightly inclined, so as to be drawn over the ground more easily. The cleat is nailed to the middle of the flat part. It is drawn by two horses after the ground has been thoroughly harrowed, and crowds down the stones and grinds up any lumps of earth. It may be driven round the ground or back and forth. In using the drag the driver stands on it. It is useful in laying fields down to grass, the seed of which is the finest we sow. Labor is the great expense in farming, and the less we can use the better we can compete with those more favorably situated. We have got to manage better and be sharper than before we were subjected to such competition. A brush harrow would be better on top-dressed land than the drag. The latter needs the weight of the driver; it carries a little wave of earth in front and fills up the horse tracks.

Rose Experiments.—Who is to be the pioneer of seedlings in the rose department? The opportunity is wide for the production of seedlings of free-blooming varieties which shall be hardy enough to withstand the difficulties of our changeable climate. We hear that experiments have been made in New York by crossing with *Rosa rugosa*, which is undoubtedly a true basis to work from. Judging from experience, it would seem wise to promote interest in this department by offering liberal prizes.—WM. H. SPOONER.

Barnum Should Have This!—Alexander Grogan, West Rutherford, has just received by mail from his brother in Mirzapore, in the northwestern part of India, a plant about a foot long. It is now withered and apparently dead. It belongs to a species indigenous to the torrid plant of Hindustan, and a few months ago it was regarded with awe and reverence, not unmingled, perhaps, with disgust, by the natives. It is an electrical plant, and has, when in full bloom, a current of electricity passing through it so powerful that a strong man touching it is staggered by the shock. Birds coming in contact with it are killed at once,—but they usually give it a wide berth. Insects are slain by thousands on its leaves, and four-footed creatures rarely go near it. It is electrified only when the sun is high. Its power wanes with the closing day, and at night the force of its current is not perceptible. During the rainy season, too, it is almost inert. Dr. Grogan will try to revive it, but he has not much hope of success.—*N. Y. Tribune.*

Don't get in a Hurry to make garden when the first warm days come. Take time. Time is lost by putting plants out too early. It is only onions and peas that ordinarily endure much bad weather in spring.

A Greenhouse Turtle.—In looking through a private greenhouse a few days since we made the acquaintance of a box-turtle, a species common in this section. We asked what his duties were, and found him invaluable in clearing out snails of all denominations, woodlice ; in short, every variety of creeping, crawling insects. The gardener assured us his services were of more value than those of a man, and his turtle-ship worked for nothing, boarded himself, and was ever satisfied with his situation.

How to Cook Parsnips.—After carefully scraping and cleaning the roots, cut them in pieces if for a stew, or in slices if to fry ; then soak them in clear, cold water for at least twelve hours ; rinse again in clear fresh water. This will take out all that acrid matter which gives this vegetable a strong taste. After that cook in the usual manner and the vegetable will be delicious.

The Celery Leaf Blight (*Cerospora apii*, Fries.).—Report United States Department Agriculture, 1889, B. T. Galloway believes that this disease, characterized by the peculiar yellowish appearance of the foliage, developes less rapidly in cool shaded places than in hot sunny localities. This the author explains upon the ground that the former conditions are more favorable to the hardy and healthy growth of the celery plant, which enables it to resist the inroads of the fungus. In the treatment of the disease the author recommends the shading of the plants, either by natural or artificial means. A roof made of laths set one inch apart and put over the plants during the growing season answers the purpose admirably, inasmuch as it allows a perfect circulation of air.

Stinking Smut of Wheat.—Prof. J. C. Arthur, in Bulletin 28, Indiana Argricultural Experiment Station, exhaustively describes this disease of wheat and other cereals, known otherwise as *bunt*. It differs from ordinary black smut by its strong odor and inconspicuousness. The head becomes normally plump, as if filled with healthy grain, but when crushed it is found that the grain is replaced by a dark brown powder consisting of a mass of spores. "The disease is caused by a fungus growing inside the wheat plant, of which there are two species : *Tilletia tritic*, with rough spores, and *Tilletia fœteus*, with smooth spores. The latter is most common in the Mississippi Valley." Some other of the author's most important conclusions are :

1. A single spore germinating in contact with the germ of the young wheat plant may enter the same, and by developing along with the wheat produce smut in the seed head.

2. The disease does not spread from plant to plant, or from field to field, but infection takes place during the sprouting of the seed.

3. Smutty seed can be purified by soaking for a short time in a solution of blue vitriol, one pound to the gallon of water, and either sow damp or first dry with plaster or slaked lime.

4. Do not sow wheat for two years upon a field previously affected by smut ; follow wheat by some other crop.

5. Avoid stable manure for wheat land, and do not allow stock to run on land to be put into wheat, since experience shows that animals fed upon smutted grain or straw may excrete with the manure large quantities of uninjured spores.

Forcing Lilacs.—One of the neatest as well as the the most novel pot plants we have met in our travels, we come across a few days since at the house of a friend, and it was, like many other good things, a creature of accident. A support was wanted for a geranium, and for this purpose a twig from a lilac bush was cut, the flowering buds remaining on it. Immediately after it had been placed in position in the pot it commenced growth, and finally developed its flowers as perfectly as though on the parent bush, excepting, of course, as regards color, which is always lighter when the plant is grown under artificial conditions —QUEENS.

The Chinese Sacred Lily (*Narcissus orientalis*). is very variable in its character. We have distributed a large number of bulbs this season, apparently all alike, and, so far as we know their treatment has been similar, but the results have been quite different. In one dish were planted three bulbs, one of which gave three enormous spikes of bloom ; the second gave six spikes, but the size and number of the flowers were much smaller ; the third gave four spikes and the flowers were perfectly double, but in all other respects similar. The first mentioned we consider decidedly the most desirable.—A.

Growing Dandelion is now a considerable business with many market gardeners. The most important point to attend to in its culture is to sow so early that the plants will attain a good size before hot and dry weather comes, otherwise the leaves will scorch.

If Rot, Rust and Blight attacked your vegetable crops last year, grow the crops in different places this year, as far as possible removed from the last sites.

The Garden Should be Begun weeks before a seed is sown. The garden should sprout and grow under the gardener's hat for several months before it is made in the ground.

Heading of Cauliflowers.—A gardener of long experience warrants cauliflowers to make fine heads if you winter small plants, say of three or four leaves, in a cold-frame. I have not tried the experiment, but knowing the man who makes the statement, I purpose to do so. Another friend claims that the failure in cauliflower in the home garden comes from poor seeds, that are produced on the lateral shoots.—S. B. D.

Egg-Plants.—Start egg-plants early. They require a long season ; but keep them growing—a check while young will injure them seriously. Give an abundance of heat ; have uniformity of heat and moisture. Dwarf Purple is a good early sort, New York Purple is the standard late sort.

Root Galls in Forcing-Houses.—Disastrous results sometimes overtake forced tomatoes and cucumbers and other plants, in consequence of galls or knots forming upon the roots. These knots are due to a minute true worm, or nematode, allied to the trichina. There is no remedy, but we can exercise care in excluding the pest. If the house is infested, remove all the earth and wash the benches with lye. Use earth from places where no root-galls have ever appeared. These worms prey upon many kinds of plants in the field.

A Little Ingenuity in garden tools saves money and makes good crops; you can often make tools that you cannot buy. Study to save the fingers and the back.

Transplanting may be safely done at all times, if the plants are puddled in cow-dung. The plants will start at once and outgrow others not treated in this manner.—S. B. D.

In Making Hot-Beds, get manure as nearly uniform in kind and age as possible. It should contain straw enough, so that when it is trod down it will not pack hard, but it should not contain so much that it will spring up under the feet. Manure from highly fed horses is best.

Cabbages after Cabbages.—I have grown cabbages six years on the same ground. The fifth crop took the the prize at our county fair, and the sixth was better than the fifth; but I fertilize. My land originally grew hard-wood and elm. I use bones and spent lime from glue factories for fertilizers.—Richard Branson.

Keeping Qualities of Pike's Peak Squash.—Your correspondent, in the January Garden, page 58, thinks Pike's Peak Squash a poor keeper. I have kept them in a pile of 75 to 100 tons in a common cellar, sound and without the slightest deterioration,—but really improving in flavor—until April 1. With me, for six years, it has been a better keeper than Hubbard or Marblehead.—T. B. Van Orman.

Hot Water for Melons.—Several years ago I planted some musk and water-melon seeds during a warm spell early in the season, but soon after they came up the weather became cool and they did not grow much. I then made a shallow trench around each hill with a hoe and into it poured one or two pailfuls of boiling water, and when it had all soaked in, filled up the trench. The effect was wonderful; the vines began to grow at once and continued vigorous throughout the season, ripening their fruit earlier than melons usually do here. If I had had some protector to cover them with on cool nights, I think they would have done still better.—J. T. Macomber.

Where to Grow Potatoes.—A successful eastern farmer gave me a hint that has paid well. He made his money in potatoes. He always planted heavily when potatoes were cheap in the spring, and lightly when seed was dear in the spring. Everybody plants when seed is dear, and *vice versa*. When everybody grows potatoes, potatoes are cheap in the winter, and *vice versa*.—S. B. D.

Small Onions.—A small place in my garden had, a few years ago, a pile of hog-hair placed upon it. This pile was the accumulation of several years' drainage from a packing house. When I removed the pile I found the ground very hard. Yellow Danvers onion was sown upon the land. The onions upon this area came up like needles, good in color, but very thin and small. The bulbs formed fully two weeks earlier than others from the same sowing. They came so early that it seemed useless to have grown sets for early bunch onions. They kept over winter well, and were good when other onions were gone in the spring. Each year, as the ground becomes looser, my onions grow larger upon this area.—Richard Branson.

Home-grown Potatoes are very Scarce in California.—The crop was not only light last year, but the bad condition of the roads has prevented the marketing of those in the hands of growers. Potatoes are now going into California from the east.

Melon Vines Dying.—Musk-melon vines which look well in the morning often wilt during the heat of the day, and revive at night. They behave in this way for several days and then die. In the soil I find hundreds of little white maggots, but I am not sure that they are the cause of the trouble. Transplanted plants have never suffered in this manner. Can some one explain?—George Doerr.

The Onion for Food.—As an article of diet the onion has not occupied the place it deserves; it is generally looked upon here merely as a relish, whereas it is really a nourishing food. In the West I have seen miners making their dinners of half bread and half onions. Their unpleasant effects on the eyes while peeling may be avoided by holding them under water while doing it. The peculiar flavor of the onion is due to a volatile oil which is very subtle, and consequently to be in perfection it should be eaten as soon as it is taken out of the ground. Their fine flavor is even more volatile than that of green peas or sweet corn.—J. J. H. Gregory.

The East Cannot Compete with the West.—Why? Because of fertilizers and the cost. I was astonished to learn from the United States Agricultural report that New Jersey grows more corn to the acre than Illinois. The Swedes and Germans who are settling on the deserted farms of New England will make farming pay where it did in days of yore. They may not bring much "book-learning," but they will bring an experimental knowledge that will reap dollars to put in the bank.—S. B. D.

Gardening Under Difficulties.—Here in Nebraska vegetable gardening is beset with difficulties of climate; the winds are high and frequent, and they blow plants from side to side, nearly uprooting them, while the dry and hot air wilts them until it seems as if growing and bearing were almost out of the question. Yet we succeed in growing as large and fine vegetables as are shown anywhere.—Wm. E. Stillon, *York, Nebraska.*

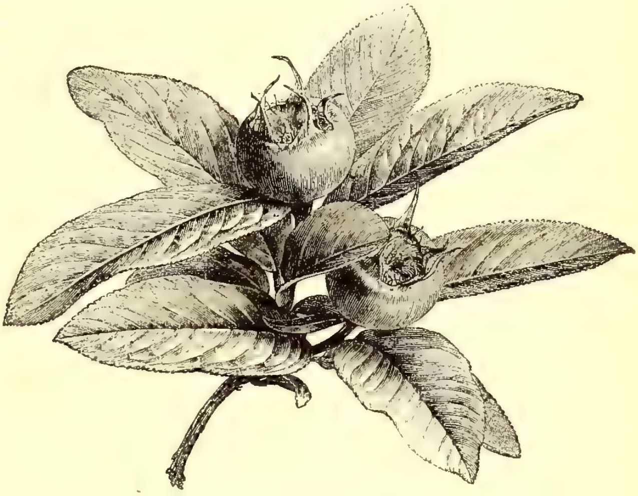
Peat Moss as a Manure Absorber.—Many suburban residents who keep one or more horses, find themselves possessed of at least a greater bulk of manure, than they can well turn under or use in their gardening operations. Straw, which is so largely used for bedding, is slow in decomposing and is bulky and awkward to handle; again, there are more or less weeds in most bedding of this character, so that when feeding our crops we are, in many instances, reinforcing their already too numerous enemies. Several acquaintances of mine are using peat moss as bedding and say that by its use they not only made a saving in expense, but find it more convenient in handling. The bulk being much less, it is much easier to plow or spade under. The late Peter Henderson once stated that he was willing, to or did pay twice as much for stable manure where pea moss was used for bedding. This moss is only found in large quantities in Germany and Holland; but it is ground up and packed so closely in bales that it is shipped to this country at a comparatively small figure. Millions of bales are used annually in Europe, where it is considered especially valuable for its sanitary properties in deodorizing the manure, a point of particular importance in parts of Holland and Germany; for example, where often the stable joins or forms a part of the dwelling.—W. H. R.

The Sibley (Pike's Peak) Squash.—John Jeannin, Jr. (page 58), is greatly mistaken in saying that this variety is a poor keeper. We grew five acres of it and three of the Hubbard, and believe the Sibley is the best keeper of all the squash family.—W. A. R. MOREHOUSE, *Rochester, N. Y.*

Red Cedar.—What is said on page 114, with regard to the slow growth of this tree, may apply to the Virginia variety; but it is not true of the Rocky Mountain kind. I have scores of four-year-old seedlings of the latter, that are from five to seven feet high. It will outgrow the White pine as well as the Norway, White and Douglas spruces, and most of the other evergreens, except the Scotch and Austrian pines. The sharp-leaved variety grows faster than the round-leaved. I think trees large enough for fence posts can be grown in eight years from the seed.—A. C. S., *Glenwood, Iowa.*

Rose Enemies.—Shirley Hibberd says the aphis and other insects troublesome to the rose may be effectually removed by enlisting the services of the sparrow. This may be done by sprinkling a handful of grain or bread crumbs two or three times a day among the bushes. The sparrows will soon appreciate your bounty, and having cleared the ground, will next proceed to clear the bushes of the aphis and other insects, taking the best possible care to repay your kindness. To render this plan a perfect success, you should keep the sparrows always on the lookout, and never supplied very bountifully. This may work beautifully with some kinds of sparrows; but we do not think the English variety we introduced for the removal of insects from our trees, could be induced, by kind treatment even, to do a good work!

The Medlar.—An interesting fruit for the home garden is the medlar. It is one of the pome fruits, perhaps more closely allied to the quince than other fruits which we cultivate. It is known to botanists as *Pyrus* or *Mespilus Germanica.* The fruits attain the size of large hickory nuts. A most singular characteristic of the fruit is the fact that it is inedible until it begins to decay. The ripe fruits are hard and austere, but if they are allowed to lie from two to four weeks disorganization begins, and they become soft and edible. This process of decay is called bletting. The bletted fruits have a peculiar subacid flavor which becomes agreeable to most persons after a few trials. We first met bletted fruits of the Medlar in Bohemia, and soon learned to eat them.



FRUIT OF THE MEDLAR.

The Medlar may be propagated by seeds, but it is better to graft the best kinds upon seedling stocks, or upon pear or quince. The two leading varieties are the Broad-leaved Dutch and the Nottingham. There is also a seedless variety, but it possesses no superior merits except longer keeping qualities. The fruits are borne singly upon the ends of shoots, after the manner of quinces. The tree is small. In Europe it is largely used for hedges.

In some parts of the south this fruit is now grown in many gardens. It can be grown in the north in sheltered places. The fruits, after bletting, are either eaten raw, or made into preserves. L. H. B.

Origin of "Sub-rosa."—It was the custom among the Romans, at their private feasts or dinners, to place a rose over the principal door, and he who passed under it silently bound himself not to reveal anything that was done, or said within; hence, arose the saying *sub-rosa*—under the rose—and even now to tell a friend anything *sub-rosa* implies that he shall not reveal it.

Vines for Mexico.—It is said that the Mexican Government has lately ordered 1,000,000 grape cuttings from California, and will distribute them free to all who wish to plant them in Mexico.

The St. Valery Apple.—The accounts given of the "bloomless apple" in the January GARDEN, remind me of what Darwin says of the famous St. Valery Apple. "The flower," he tells us, "has a double calyx, with 10 divisions and 14 styles, surmounted by conspicuous, oblique stigmas; but is destitute of stamens or corolla. The fruit is constricted round the middle and is formed of five seed cells, surmounted by nine other cells." Of course, the tree requires artificial fertilization, and the girls of St. Valery annually go to "*faire ses pommes*" (make their apples), each marking her own tree with a ribbon.—L., *Charleston, S. C.*

California Grape Syrup.—A very healthful article of diet may be prepared by ordinary boiling of the juice or must of the grapes. Cheaper syrup may be obtained by this means than by any other. Many years ago when grapes were very low, growers found an important outlet by this means; the same being sold through the trade in jars and kegs for family and domestic use. Large quantities of this product are annually consumed in sweetening ports, sherries, angelicas, etc.—J. H. WHEELER.

Glazing Vineries.—A few years ago a novel system of glazing cold vineries was advocated in which, instead of the usual lapping of the glass, the edges are left apart half an inch or less. This gives the same ventilation that is effected by leaving the ventilators open night and day, which I have found by long use to give better results in growth and color of fruit, as well as the saving of labor and care of the daily opening and closing. This manner of glazing would also allow the rain to fall on the inside borders, saving watering by hand, which is always neglected by amateurs, and it would be less expensive to build. Who has had experience with this system?—FLETCHER WILLIAMS.

Prices of Quinces.—In the October GARDEN I saw quinces quoted at $2 to $3 a barrel. We pay $5 a bushel for them, but at any price not many of them are used, simply because the cooking of them is not understood. The nicest cooking fruit we have goes begging when offered for $2 to $3 a barrel.—S. D. POND, *Boston.*

Pineapples in Florida.—I am sure there will never be an over-production of pineapples. I have made wine from the fruit, which proved excellent and had a fine bouquet. I also make cider from it. The acid of the pine is one of the best for the stomach. Vinegar is also made from the juice, which discounts Northern vinegar. I think a good article of brandy could be made from pineapples, as there is a great amount of saccharine matter in them. They are also canned, so that all can be used. I have a few new varieties of pineapples, some being much better than the standard sorts. The Egyptian Queen is a better fruit for most purposes, but it is not good canned. The large pines, such as the Trinidad, are shy bearers and a rather coarse fruit, but they are very handsome and bring a good price—from a dollar to a dollar and a half per apple.—THOMAS E. RICHARDS.

New Races of Peaches for the South.—A Louisianian regards the Japan Blood peach as "a decided improvement in every way to the early peaches, such as Beatrice and Alexander. He further declares that the "Japanese, Spanish and Southern China varieties of peaches will undoubtedly supplant all others, at least in the Southern States, as they seem to do well and bear abundantly. Thus far there are some twenty-five varieties, many of which are very superior."

The Shirk Apple is a new late sweet apple which originated with John C. Shirk, of Brookville, Indiana. Mr. Van Deman, United States Pomologist, speaks as follows concerning it: "It is quite large and handsomely colored, being distinctly striped with red. The flavor is very sweet and pleasant. It ripens in October in Central Indiana, and among the fall apples it is a very good one, and I am informed by Mr. Shirk that the tree is an excellent bearer. In my opinion it surpasses nearly all the sweet apples ripening at this season.

Decapitating Trees.—When an expert arboriculturist transplants ornamental trees from the forest, such as maple, elm, or basswood, he saws off the entire top, leaving only a bare stem, like a hop-pole. Why does he cut back a tree to such a damaging extent? Simply to maintain the balance, or equilibrium between the amount of roots and the quantity of branches and twigs. When a tree is dug up, a large proportion of the root is left in the ground, and the top must be cut off in proportion. The great practical lesson to be learned from this fact, is to watch every tree that does not grow as rapidly as it should, and cut away one-fourth, or half, or even all of the top, sometimes leaving nothing but a bare stub. As soon as the roots begin to take a vital hold on the soil, there will be sufficient sap to develop good twigs and buds. A person who does not understand this subject correctly will lack courage to cut off a tree-top. I have cut many fruit trees from April until August, before I could remove enough of the top to induce the tree to send out new buds and to grow vigorously. When a tree does not grow well, I saw the top squarely off a few feet from the ground, and cover the wound with grafting wax. Many trees die or become feeble because they carry too much top.—ESS. E. TEE.

Morning Glories.—In looking for beautiful plants for the window garden, in winter, or at any time, for that matter, do not overlook the importance of this little old, well-known, and ever beautiful annual, the morning glory. It seems especially adapted for a house plant; in pots it loses its rampant growing habit, adapting itself to the situation with commendable propriety. We have just seen at the house of a friend, a four-inch pot, in which there are half-a-dozen plants growing, yielding each day their beautiful flowers, the most remarkable peculiarity being that when grown in pots, they flower when not more than four inches in height. The flower remains open throughout the day. The first flowers appear with the second part of leaves. Make the morning glory as rare as an orchid, and as expensive, and it would have the preference.

PLANT DISEASES.

Preventive Measures against Smut.—Dr. Julius Kuhn in *Mitteilungen des Landwirthschaftlichen Instituts de Universitat Halle* for March, 1889, advises the following treatment of grain seed as a preventive of smut: The seed is first soaked for at least twelve hours in a one-half per cent. solution of copper sulphate, which should be used in such a quantity as to cover the lot of seed to the height of the hand. The above mixture of copper sulphate can be made by dissolving one pound of copper sulphate in 22 gallons of water. This solution if then poured off and the seed mixed with milk of lime, as the rate of one pint of the liquid to every pound of the seed to be treated. To prepare the milk of lime, one pound of the best quick-lime is carefully slaked and mixed with ten and one-half gallons of water. The seed should be in contact with the lime water for about five minutes. It is then poured off, and without washing with water the seed is spread thinly upon a floor to dry. The sowing of the seed should then follow as soon as possible. The seed should be carried to the field in sacks, which have previously been soaked in the one-half per cent. solution of copper sulphate for 16 hours, and then washed in water. The author claims that the germinating qualities of the seed are not in the least injured by this process.

Potato Scab.—In *Zeitsch des Landwirthsch, Central Vereins der Provinz Sachsen*, January, 1889, Dr. J. Kuhn discusses the prevalent ideas respecting potato scab. The theories that the presence of a large amount of iron in the soil, or the use of manures or street sweepings may favor the scab received no support. The theory that the presence of much lime in the soil aids the growth of scab is denied by the author, who cites cases where potatoes have been grown free of scab upon land either naturally rich in lime or made so by the application of marl, and in one case where scabby seed had been used little scab resulted even upon highly limed land. Walroth believed the cause of the disease to be a parasitic fungus, which he named *Erysibe subterranea*, but the author shows that this claim was improbable, inasmuch as the fungus is not always found within the scabby spots. Later, Brunghorst found in the potato a slime fungus, which caused an affection similar to scab, but Kuhn is uncertain whether this is really the true scab, as generally known. The whole result of the discussion is to show that none of the theories yet advanced are satisfactory, and the cause of the disease is a question yet open to investigators.

Sorghum Blight.—Professor W. A. Kellerman in the first annual report of the Kansas Experiment Station describes a *blight* of the sorghum plant, which is characterized by reddish blotches on the leaves, leaf sheaths and roots. The disease may in some cases entirely kill the plant, or in mildew cases simply check the growth The blotches are irregular in shape, though mostly more or less elongated; but they may widen, so as to involve the entire surface. A very faint orange discoloration is usually the first indication of the diseased spots, which become deeper, changing to various shades of red, and finally to a very dark red. The affection of the leaf extends to the roots, and in some cases the stem at the junction with the roots also becomes discolored and diseased. The cause of the malady is a form of bacteria, which Prof. Burrell found in the affected parts and named *Bacillus Sorghi*. The author was able to cultivate these organisms upon sterilized potato and in other nutrient media, material from pure cultures being used to inoculate healthy plants. The result of these inoculations was the production of red streaks like those on the original specimens. The author claims that the disease can be transmitted, to a certain extent, at least, through the agency of soil, infection resulting in most cases by planting seed in soil from a diseased field, while seed planted in soil taken from a source removed from probable contamination gave plants quite or nearly free from the trouble. Burrell claims that the bacillus can retain its vitality through the winter in stalks and stubble remaining in the field, and hence advises the burning of all diseased material, and a proper rotation so as to avoid infection by planting a second crop upon an infected field.

Diseases of Rose Seeds and Seedlings.—H. Drögemuller, in the *Rosen Zeitung*, calls attention to the causes which long delayed the production of new varieties in Germany, and in the discovery of which he had an important share. The apparent seed of the rose is not a true seed but an *achene*; that is, a seed surrounded by a hard shell. This shell has, in the majority of cases, a small hole by which fungus germs, especially those of the common green mould *(Penicillium glaucum)*, reach the seed itself and destroy it. If the rose seed is not at once placed and kept in air-tight vessels, it will be found on sowing that only about five per cent. germinate. Another fungus attacks the roots of the young seedlings. The plants die suddenly without any previous symptoms of disease. Herr Drögemuller found that this root-fungus is a form of the "rust" (*Phragmidium subeorticum*) which attacks the stems and leaves, and that the roots of very many other plants are similarly affected by fungi which are merely subterranean forms of other fungi which appear as rusts or mildews upon the leaves. It is not meant by this that the leaf and root fungi are merely varieties of the same fungus, but that each is the actual parent of the other. This phenomenon, called "alternations of generations" is common to many of the lower forms of vegetable life. In the last few years, after this evil had been discovered and remedied (by what means is not stated), a number of fine new German roses have appeared. Among them are Kaiser Wilhelm, Furst Bismarck, Furstin Bismarck, Kaiser Friedrich and Kaiserin Friedrich. The last two are seedlings of Gloire de Dijon, crossed with Countess of Oxford and Perle des Jardins. Kaiserin Friedrich is of a brilliant golden yellow, beautifully shaded with carmine. Perhaps it may be compared to Gloire de Dijon with the colors of Marie van Houtte. It has been pronounced by connoisseurs the finest of the Tea class.

CONFERENCE CORNER.

A Bacterial Disease of Corn.—January GARDEN, p, 53. This malady has prevailed here for many years. The description in the review corresponds exactly to the disease as I have seen it. But it works entirely on old corn ground. By rotating our crops of corn we avoid the disease. I have always thought that the disease was due to an insect, and am still of that opinion. An insect lays its eggs about the base or roots of the plant, and these eggs hatch out into hundreds of maggots.—W. F. WING, *Pueblo, Colorado.*

Injuries from Snails.—For some years my flowers, plants, grasses, and even trees have shown depredations by some insect or worm. After careful watching I found the depredators to be snails, a shelless kind, that forages at night and hides during the day. They have increased until I am in a fair way to be a complete victim. Last summer they went to the very tops of the highest plants, devouring flower, leaf and branch. Sweet peas, hollyhocks, pansies, grasses, almost everything is the object of attack. I notice that they have slimed the glass of cold-frames this open winter. What can I do to be rid of them?—GEORGE P. HUNTER, *Warren, O.*

[Snails are often destructive to many kinds of plants. They are usually worst in wet years. The common remedy or preventive is quicklime dusted over the ground and the plants. The application must be very frequently repeated to be effective. But wherever it can be used, some poison is best. Paris green and London purple sprayed upon the plants are to be recommended, or hellebore may be used.—ED. AM. G.]

Heat for a Greenhouse.—We have a large conservatory 80 feet long, 30 feet wide, 20 feet high, 6 feet from ground to the gutters, side ventilators, all the glass 6x8 inches, aspect northeast by southwest, with a slight slope in ground to the north, exposed to the winds. Heating aparatus to be at northeast end. 30 feet of southwest is to be used as grapery; glass partition The house was built 30 years age aud is in a tolerable state of preservation, so that my employer does not wish to have it taken down. The heating aparatus is entirely gone. Would you recomment this to be heated with steam or hot water? Would like some heat in grapery. I know that the house will be difficult to heat properly. If steam, can you recommend any particular aparatus, or would a locomotive boiler answer?—J. F. C., *Philadelphia.*

[The ideal heating system is one which uses both hot water and steam, as circumstances may require. Several apparatuses can be used for both systems. In any case, pipe the house essentially as if you were to use steam, for the ordinary steam pipes are better than the old-fashioned cast-iron pipes for hot water heating. We suspect that you will find hot water preferable for your conditions, particularly as you have a grapery to heat. For heating apparatuses, consult our advertising columns.—ED. AM. G.]

Portable Houses.—*L. V. M.*—These may be obtained of either the Grand Rapids Portable House Co., Grand Rapids, Mich., or Decker Portable House Co., 735 Broadway, New York City.

Kentia Forsteriana.—*J. T. T.*—You should have but little difficulty growing this plant. In the summer it needs plenty of water, both at root and top. It is apt to be troubled by the red spider or thrip, in which case soapy water will be found efficacious.

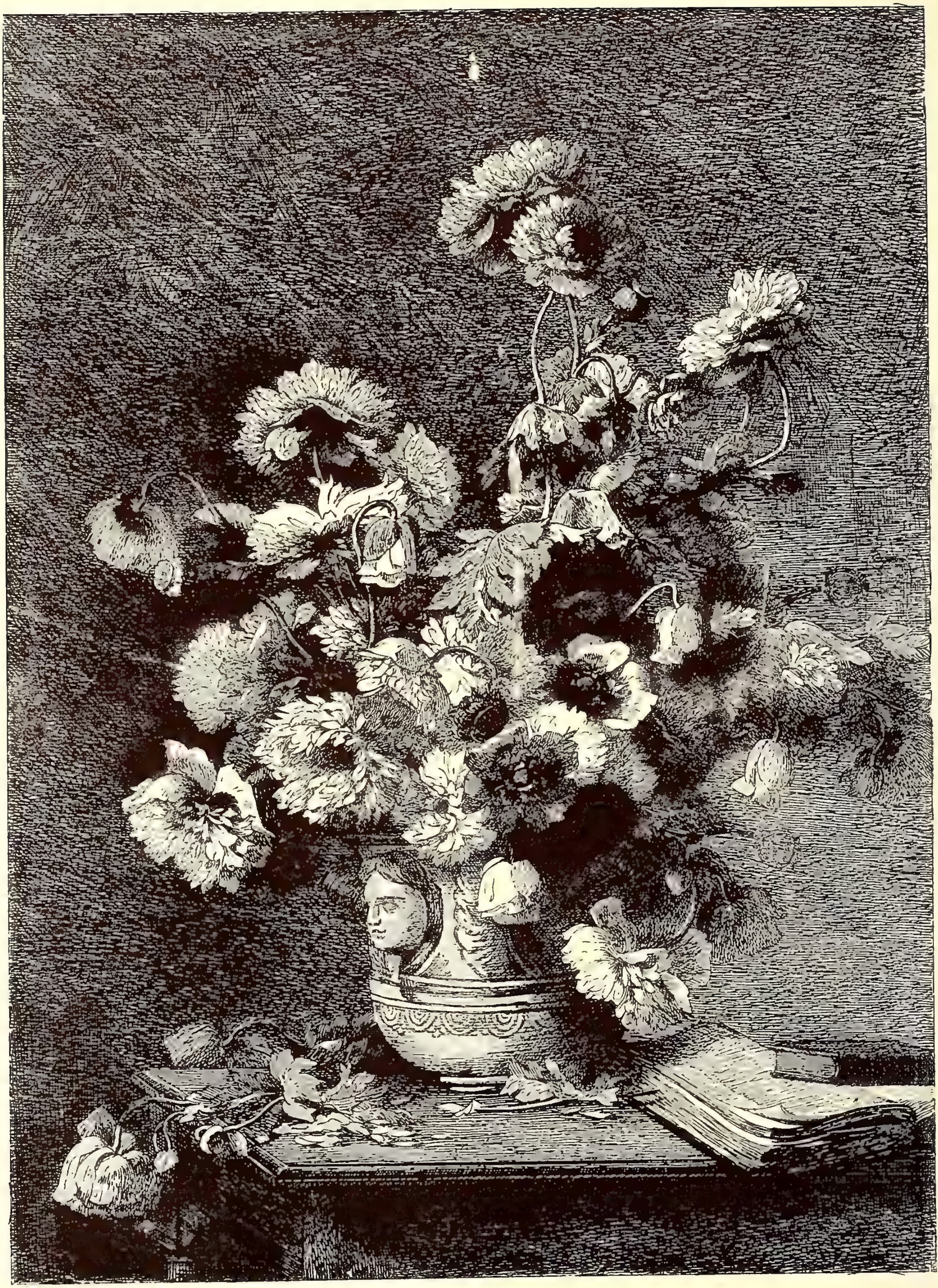
Lady Washington Geraniums.—*L. B. H.*—This variety is no longer in existence. The general opinion is that the name is specific, or applied to a class, which is a mistake. The name was given to a variety of the fancy pelargonium, so long ago that it has been lost sight of, and the variety has had to give place to others far more beautiful.

Alpine Plants.—*F. G. J.*—There are plants found growing at high elevations, not necessarily in the Alps, as the name would imply. Many of them are very beautiful, but cannot be grown in a sunny exposure. A shaded rockery, where there is plenty of moisture, is what they require.

Do Fruit Trees Come True from Seed?—*A. G. F., Keeseville, N. Y.*—In general, no. All the common sorts of apples do not reproduce themselves from seeds, but some Russian sorts will do so with tolerable accuracy. A few peaches, as Hill's Chili, come nearly true to seed, and the Crawfords have that tendency. But it may be stated, as a principle, that varieties of fruits do not reproduce themselves from seed.

Locomotive Cinders as a Mulch for Trees and Shrubs.—*W. C. Egan, Chicago.*—Cinders dumped from locomotives, like any coal ashes, make a tolerable mulch. But they are apt to pack too hard, and must therefore be loosened up occasionally. A looser mulch, like straw or some litter, usually keeps the surface of the ground in better condition, and its decay affords some nourishment to the plant.

Chicory.—I would feel much obliged if any of your readers could tell me the methods of growing, drying, roasting and grinding, and generally the best method of disposing of a crop of chicory. It seems to do well here.—FRED. D. COOPER. *Souris, Mass.*—Chicory is a very easy crop to grow. Although a perennial, it is treated as an annual In fact, the culture does not differ, if roots are wanted, from that of the parsnip or salsify. By fall the roots will be an inch or inch and a-half in diameter, and will weigh from 6 to 12 oz. The roots are cut into thin slices, roasted, and then ground. The Brunswick and Magdeburg are the best sorts for root production. For leaf-salads, for which Chicory is much grown, these sorts and several others are good.



A Vase of Poppies.—From an Old Etching.

The American Garden.

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LOOK OVER THE FENCE.

A CENTURY ago, in 1790, there were in this country many more people living in the country than in the towns. A town is any collection of houses containing in one group 8,000 people. Now, during the century the entire population has increased sixteen times and the town population has increased 160 times. The town population grows faster than the average rate of the whole population. This increase of town residents has been chiefly since 1850, and the rate of the increase is more and more rapid. In 1850 we had 85 cities of an average of 35,000 inhabitants. In 1860 we had 141, and in 1870, 226 cities. In 1880 we had 286 cities, and the average population had risen to nearly 40,000. This year a new census is to be taken, and we may confidently look forward to still more cities and a still higher average population. A hundred years ago one-thirtieth of the people lived in towns; in 1860 one-sixth, and in 1870 one-fourth of our people were town-dwellers.

Many people have looked upon this wonderful growth of city population with alarm. They view with regret the continual emigration of the young people from the farm to the factory and shop. We hear much of the decay of farms and of the rapid decline of the whole business of raising food from the ground. We sit in our little gardens and wonder why the farm does not pay better. Would it not be wise to look over the fence, or tear the old thing down and look out over the fields to see what all this means, and what it portends for the future gardens of America?

If more people live in towns than a hundred or even twenty years ago, clearly there are more people to be fed in proportion to those who produce the food. What is a garden for? Why does anybody work on a farm? To produce food. With the exception of fish, all the food in the world comes from the garden. (The word garden may be used to include the farm, plantation and orchard.) If at one time one person in thirty depended on the other twenty-nine for food, to-day every fourth person depends on the other three to feed him from day to day. One thing more. The entire population of the world is, at all times, within ten months of universal starvation. Within two years the entire people would be absolutely without means of clothing themselves. The garden is our only means of warding off the complete extinction of the race. The cities would perish of cold and hunger in short order if every one should retire from the work of the garden. It is, practically, far more serious than this, because great cities like New York do not and cannot store food in any great quantities. This was painfully illustrated at the time of the blizzard two years ago. New York absolutely leans on the garden, and is kept alive from hand to mouth, day by day, by the products of the land.

This first glance over the fence shows us a great and immensely important field of study. How happens it that with this enormous increase of the number of food-eaters that the business of making food is so unprofitable? Is it really true that the garden does not pay? Food is certainly cheaper than ever before. Common cotton cloth was twenty-five cents a yard not so very long ago. It is six cents to-day, and yet the operators in a cotton mill to-day earn more wages and cotton mills pay bigger dividends. Perhaps if we look at this matter of cotton cloth we may get a hint that will help us. When sheetings were high, workmen in

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the mills received low wages and produced only a few yards in a day. The owner of the mill paid a high price for his machinery, and had to be content with small dividends. To-day sheetings are low, wages are high, and yet machinery, by reason of its higher speed, really produces more cloth and pays a larger dividend. The interest on the plant is lower, and yet the profits are greater. It is not true that machinery makes the rich richer and the poor poorer. Machinery enables the poor to earn more for less labor and to buy sheetings cheaper, while the mill owner, paying less interest, earns less per yard of cloth made and more per dollar invested in machinery.

Is there not here a hint for the garden? Food is undoubtedly cheaper than a hundred or even twenty years ago. It takes less labor to earn a barrel of flour than ever before. Millions of our people have to-day a better bill of fare on their tables than even the rich had a hundred years ago. Our city working-people would not and could not go to the dreary and monotonous dinner table of the farmer of fifty years ago. Fruit is for sale on every street corner. Fifty years ago it was a luxury only for the well-to-do. We may thank the Italian for teaching us the value of cheap fruit stands. The canning and preserving of food has cheapened the cost of living and made a market for enormous quantities of fruits and vegetables. There is the sewing machine. It has made it easy to have a great variety of clothing, and as a result we wear more clothes than did our fathers, and this means millions of dollars poured out on our cotton fields.

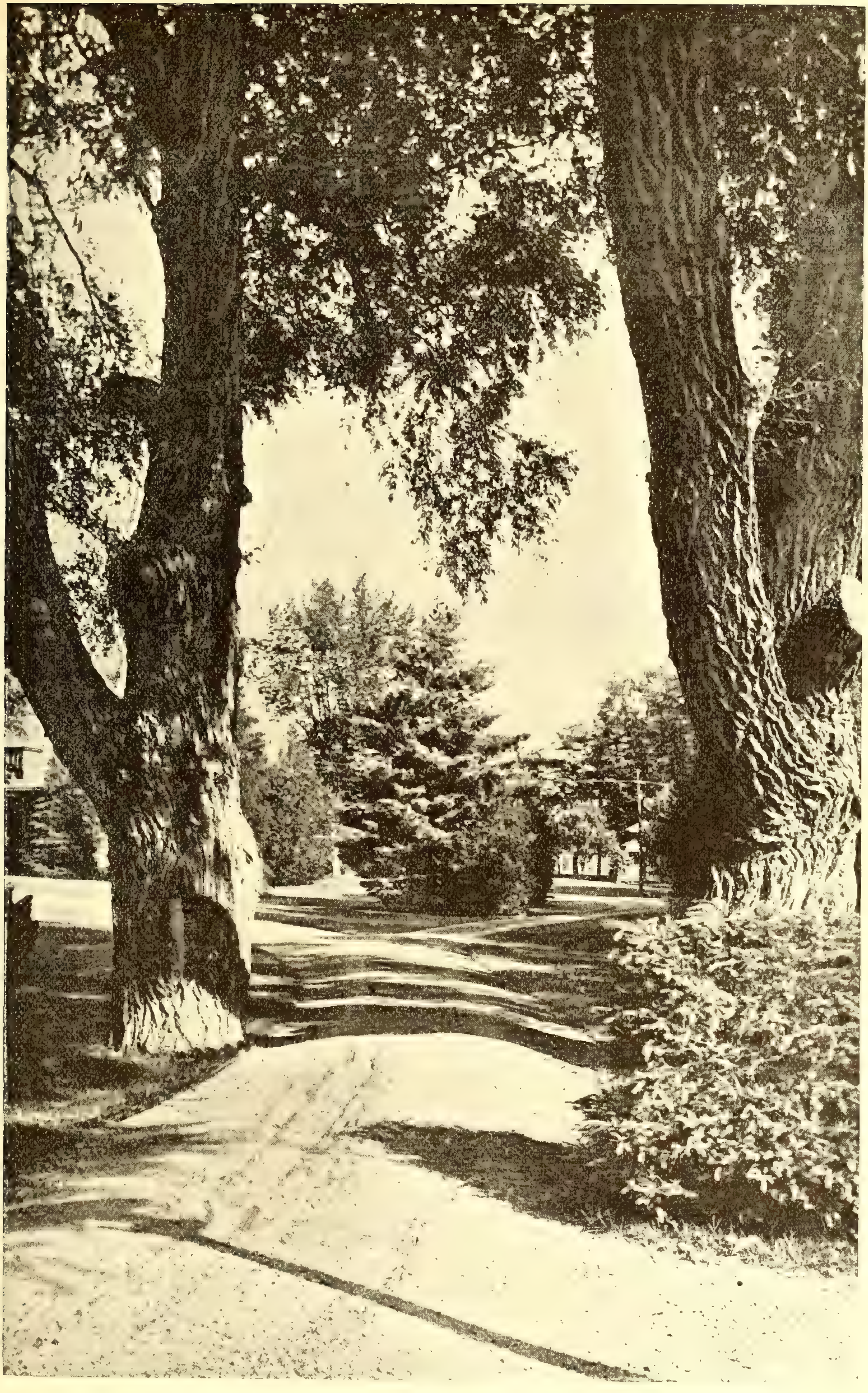
In all manufactures we see a steady concentration of capital and labor. The shoe shop has absorbed the little shoemakers. At one time the fishermen on the New England coast had, every man, a little shed or room set off from his house where he made shoes in the winter by hand. If we depended to-day entirely on hand-made shoes we would soon be a bare-foot nation. On the other hand, in this immense business of raising food we cling to the old hand methods. It may be a question whether the complaint of the poor profits of gardening may not spring from the very fact that we raise food too much by hand. Wheat is raised in the northwest on the factory principle. It is manufactured food, and the great wheat-producing places are not farms, but factories employing land instead of shops. How is it possible for one man in New York state with two horses and a day laborer to compete with a wheat factory? He cannot, and the sooner we look squarely over the garden fence and see things as they are, the better for all concerned.

The gardens are here. We live on them and by them. The thing to do is to change our methods. If we cannot raise wheat we must do something else. Every fourth person in the country looks to us for his daily food. He is better able to pay than ever before, but it is not to be expected that he will pay the old prices. We must make food cheap. The city workman is in a shop built on capital that pays two and a half per cent. How can we feed him and pay six per cent. on the value of our land?

Those things suggest many serious problems to the American gardener. Our first glance over the fence shows us not the gloomy outlook we had thought, but everything to encourage. More and more people to be fed every year. Less and less people in the business of raising food. Actual lower prices for garden products and a thousand times more food wanted. Cities not only devour enormous quantities of food, but the eaters are growing wonderfully critical. They want variety, they want things out of season and they want the luxuries. Lettuce is on more dinner tables to-day than fifty years ago, and somewhere there must be hundreds of acres devoted to lettuce that was then woodland or pasture.

This glance over the fence shows so many things to study and examine that it may be well to look wider afield, to try and see where our gardens are drifting to, and to try and guide them back to the prosperity they are said once to have had. THE AMERICAN GARDEN aims to help in all wise and proper ways. It certainly aims to tell the truth, and to call a spade a spade. It hopes to look over the fence again to talk with merchants, planters, farmers, storekeepers, railroad men, bankers and statesmen to see what they say of the future of this immense question of feeding the people. Perhaps from these wide out-looks over the country we may find something of benefit to every man and women who has a farm, plantation, orchard or garden.

CHARLES BARNARD.



Yellow Willows at Cazenovia, N. Y.; from a Photograph sent by L. W. Ledyard.

WHAT GRAPES SHALL I PLANT?

VARIETIES FOR HOME AND FOR MARKET.

GRAPE culture is full of interest to the careful cultivator. In gardening, selection of varieties is all-important, given soil and location. This pertains with all fruits, grapes not the least. It is a puzzling question to the novice, and one not easily answered by the professional. Were I to locate on a new place in a different locality with a different soil and climate, and using my best judgment after all my experience, I might make a mistake in some varieties, for the above conditions are all important factors in influencing results. We have ample evidence of this fact in the conflicting testimony emanating from differently located cultivators as to the merits and demerits of certain kinds.

Other considerations, no doubt, contribute to these differences, such as variation in taste and pecuniary interests, which, it is feared, sometimes bias judgment; and the most careful and critical analyst will hardly prove sufficiently infallible to detect the extent of these various influences.

The New Jersey State Horticultural Society in 1884 took a vote as to the best six varieties of grapes for general use, two of each color, with this result: Brighton and Jefferson for red grapes; Pocklington and Duchess for white, and Concord and Worden for black varieties. At this day, there can hardly exist a doubt but that pecuniary interests dictated some of the votes on that occasion. At all events, if the same persons were to vote to-day with the added experience since, the result would doubtless be very different.

Last year the society took a vote as to the three best grapes for general culture, one of each color, which resulted in favor of Brighton, red; Niagara, white; Worden, black. It will thus be seen that since 1884 the Niagara and Worden have been growing in public favor.

A more extended concensus of personal experience is found in the society's fruit list, compiled from the individual reports from thirteen counties, and embracing individual experience from many outside of the society membership. This list is composed of thirty-four varieties, and taking eight of each color receiving the highest votes for family use, twenty-four in all—an ample number for general purposes—the result was as follows, in the order named:

Red: Brighton, Agawam, Delaware, Salem, Catawba, Jefferson, Lindley and Diana, the two latter being a tie.

White: Lady, Pocklington, El Dorado, Martha, Niagara, Prentiss, Duchess and Lady Washington, the second and third a tie.

Black: Moore's Early, Worden, Concord, Wilder, Hartford, Champion, Clinton and Ives.

This list was compiled in 1884 from votes received subsequent to the annual meeting, at which the first vote recorded above was taken. It will be noticed that Brighton heads the list of red grapes in each case. While Jefferson stood second in the first vote, in the list it stands sixth. Pocklington and Duchess, considered the best whites in the first vote, were neither of them noticed in the second vote, and stand second and seventh in the last list respectively. Concord and Worden changed places, and are headed by Moore's Early. No doubt if the vote were taken to-day there would be as great if not greater changes in the result, and if all those voting had experience with all the varieties, the result would represent very fairly their status in public esteem; but until such experience forms the basis of each one's vote, there will exist discrepancies in all lists of this kind that can be explained in no other way.

To me, the most striking feature of the list is the position occupied by Pocklington and El Dorado. The former is a very foxy grape of poor quality, with strong proclivities to rot and uneven ripening, and has failed to make much of a show at exhibitions, a very good indication of its value. The latter is a grape of most delicious quality, but so notorious for poor setting, that I wonder what the existing conditions are where it produces satisfactory clusters.

Foxiness, or native aroma, in a grape is not considered an orthodox quality by grape-growers generally, especially for family use, but occasionally we find a person who prefers that peculiar flavor to all others. I have put Pocklington on the market that were sold for 20 cents a pound, as much as my choicest Niagara brought, which seems an indication of a preference on the part of the purchaser for its peculiar odor; for the size and beauty of the clusters were far inferior, and in my judgment the quality is also.

On the whole, the list is a very good one, and as a guide to the inexperienced may be relied upon as likely to give good satisfaction, not only in New Jersey but over a much wider area. Following my experience with all the varieties named—and many more—I should change the positions of some, eliminate some, and substitute others in their places. For instance, I should take Jefferson out entirely, because of its unreliability. I felt quite certain it would prove a decided acquisition when first introduced, but I have never yet been able to get a decent cluster to ripen. Before that period arrives it invariably mildews and bursts so as to be absolutely worthless. I would put Rogers' 32 next to the Delaware, Lindley next to that, and move Agawam down to the foot. I am not certain but with a good season I should put Berckmans next to Brighton, and perhaps make some other changes further down.

In the whites, I would move Niagara up to the head, a position it is justly entitled to in an equal contest with all the others. Pocklington I would send down to the foot or very near it. El Dorado, Prentiss and Duchess, in point of quality or flavor alone, would stand next to or before Niagara, but the poor setting of the first, the lack of hardiness in the second, and the extreme tendency to rot in the third, place them far down in the list, and possibly some other whites on trial will before long take their places entirely. I had hoped that the Empire State would have done this before now, but its promises have not been fulfilled on my grounds. The Lady and Martha will have to answer as apologies for early sweet white grapes till something better takes their places. Their tendency to crack and decay on approaching maturity render them of little value. As a late white, Lady Washington would doubtless stand higher in my estimate, if I were more favorably located.

In the list of black ones, I would put Worden before Moore's for its quality, but the latter is good; in fact, the first four may stand as they do in the order of their ripening, and Barry (Rogers' 43), Herbert (44), Merrimac (19) and Aminia (39), may well replace the last half of the list.

The reader will please understand that these views are based entirely on a family use basis. Grapes to eat and grapes that are good enough for my family consumption I consider good enough to sell to other people for the same purpose. At the same time my list comprises some of the most profitable varieties for market purposes.

The Champion has no other merit beyond its value as a commercial grape. If I grew it for that purpose I should not put my name on the packages. For the same reason I should not brand my Ives if I marketed them in the unripe condition in which they are generally thrown on the market, but when fully ripened and well grown no one need be ashamed of the ownership. I have eaten fine looking Duchess purchased on the market that were too sour to be eaten without making a wry face, but the fault was with the grower, not the grape, and this avaricious spirit is the worst foe to a good market and good prices.

New Jersey. E. WILLIAMS.

TOP-GRAFTING OLD TREES.

THE CONSTRUCTION OF THE NEW TOP.

April is early enough, in the northern states, for grafting out of doors. It is only those who make top-grafting a business who need to begin in the raw days of March. In fact, the ideal time for out of door grafting is when the leaves are beginning to show. The juices of the plant are then moving freely and scions are sure to grow if set with ordinary care. Even after the leaves are fully formed, old trees may be grafted, but the growth of the scion is apt to be less than if it is set earlier in the season. I recollect having grafted an old and large apple tree one Fourth of July. The scions lived, but the growth was slight. It is not generally known that the longitudinal growth of trees usually ceases or becomes very slow by the first of July, even in the northernmost states.

The greatest difficulty connected with the grafting of old trees is the proper shaping of the new top. At best, this new top is apt to be an unhandy one. Each scion soon takes on a branching habit after the manner of a small tree-top, and even though it may be pruned into a narrow compass, it always eventually occupies more room than an ordinary branch. For this reason, only a part of the branches of the old top can be grafted, and the new top has fewer low and secondary branches than the old one. The new top, therefore, is often a difficult one in which to secure a foothold in pruning and picking times.

There are two opposing methods of re-shaping the top of an old tree. The older one grafts a few large limbs low down in the head, for the purpose of retaining the original height of top. As I have seen it practiced by old grafters, six or eight limbs of 20-year old trees are grafted where they are from three to five inches in diameter, and these grafters usually prefer to place the scions within three or four inches of a crotch in order that the remaining limb may "draw up the sap." There are several vital objections to this old system: 1. It removes too much of the tree, for practically the whole top is cut away. 2. The wounds are so large that decay is likely to set in before they heal; in fact, it is rather the exception if they heal well. 3. Scions are much less apt to live than when inserted in small and younger limbs. This is particularly true when the scions are inserted near a crotch, for the remaining limb makes rapid growth after its twin is removed, and instead of "drawing up the sap" to the scion, it draws nourishment away from it. The wood of old portions is so rigid, also, that small scions are apt to be squeezed to death.

The second or newer system aims to graft many and small limbs, and by so doing it avoids all the disadvantages of the old system. But unless properly applied, it gives rise to the fault which the first method seeks to avoid—it raises the new top too high and makes long and pole-like branches. To obviate this difficulty, great attention is required.

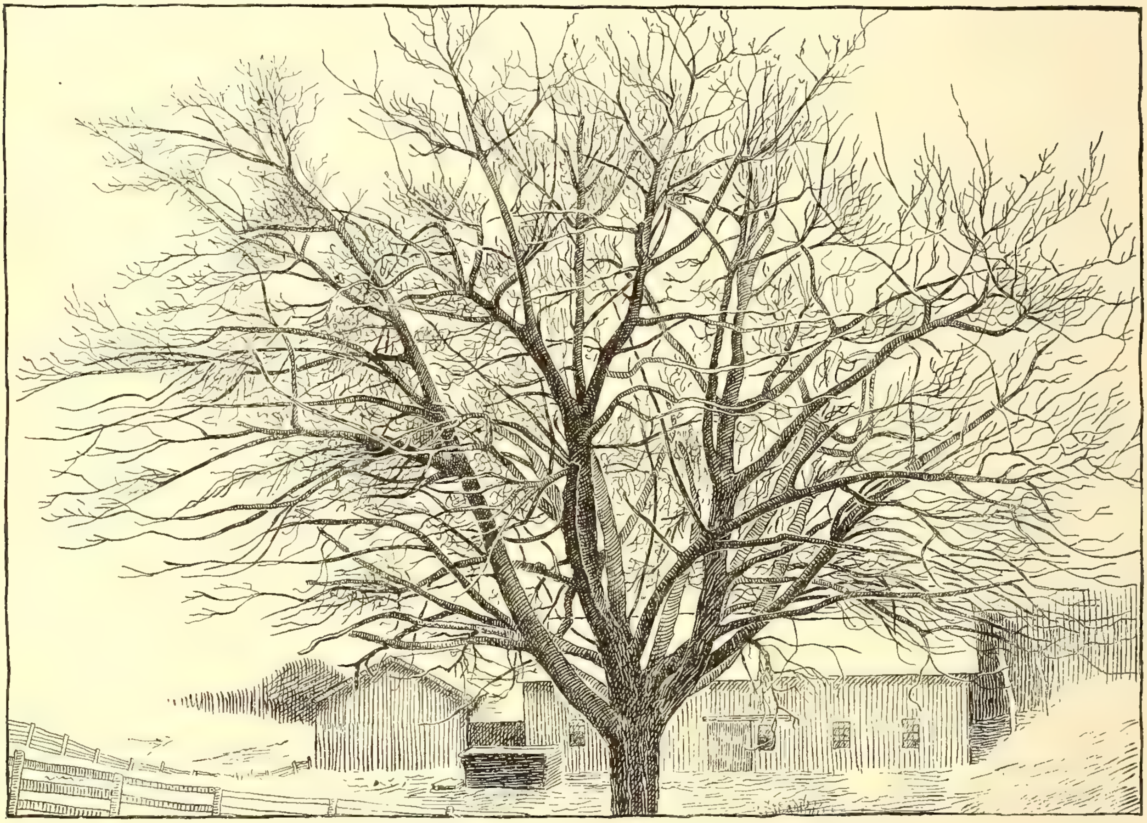


FIG. 1.—A 25-YEAR-OLD APPLE TREE BEFORE TOP-GRAFTING.

It is impossible to fully describe the best method of shaping the top, for each tree needs particular treatment. The illustrations, made from photographs, illustrate the practice. Fig. 1 shows a neglected tree twenty-five years old before operations are begun, while Fig. 2 shows the same tree after the grafting is done. There are no "stubs"—as the grafted extremities are called—over 1½ inch in diameter, and many of them are an inch or less. It will be noticed that the main stubs are approximately equi-distant from the trunk. This arrangement insures a rounded and symmetrical top, closely approaching the form of the original tree.

In order to fill up somewhat the lower part of the tree and to avoid too many pole-like branches, the most important secondary or side-limbs are grafted. But it must be borne in mind that the scions in a horizontal limb grow upright and not horizontally, and they must therefore be so placed as not to interfere with branches above them. For the same reason, a scion should not be set under another in the same stub; that is, the cleft in a horizontal branch must be made horizontally.

Perhaps a few general rules concerning the form of top and positions of stubs and scions may merit separate statement:

1. Graft many limbs and small ones, rather than few and large ones.

2. From an inch to an inch and a half is considered the proper diameter of a stub in old tree.

3. Arrange the stubs approximately equi-distant from the trunk of the tree.

4. Graft some of the most important secondary and side branches in order to retain the original height of top, and to supply foot-rests for climbers.

5. Select for the stub a smooth and straight portion of the branch.

6. If horizontal limbs are grafted, the stub should be so placed that the growth of the scion will not interfere with branches above it.

7. Do not graft in or near a symmetrical crotch.

8. In horizontal stubs, make the cleft horizontally, that one scion may not stand over the order.

It is not to be expected that all the scions are to remain permanently in all cases. One good scion is usually enough after two or three years. We insert two in each stub for the double purpose of increasing the chances of a full "stand" of scions, and to aid the healing of the stub. It is always better to insert too many stubs than too few.

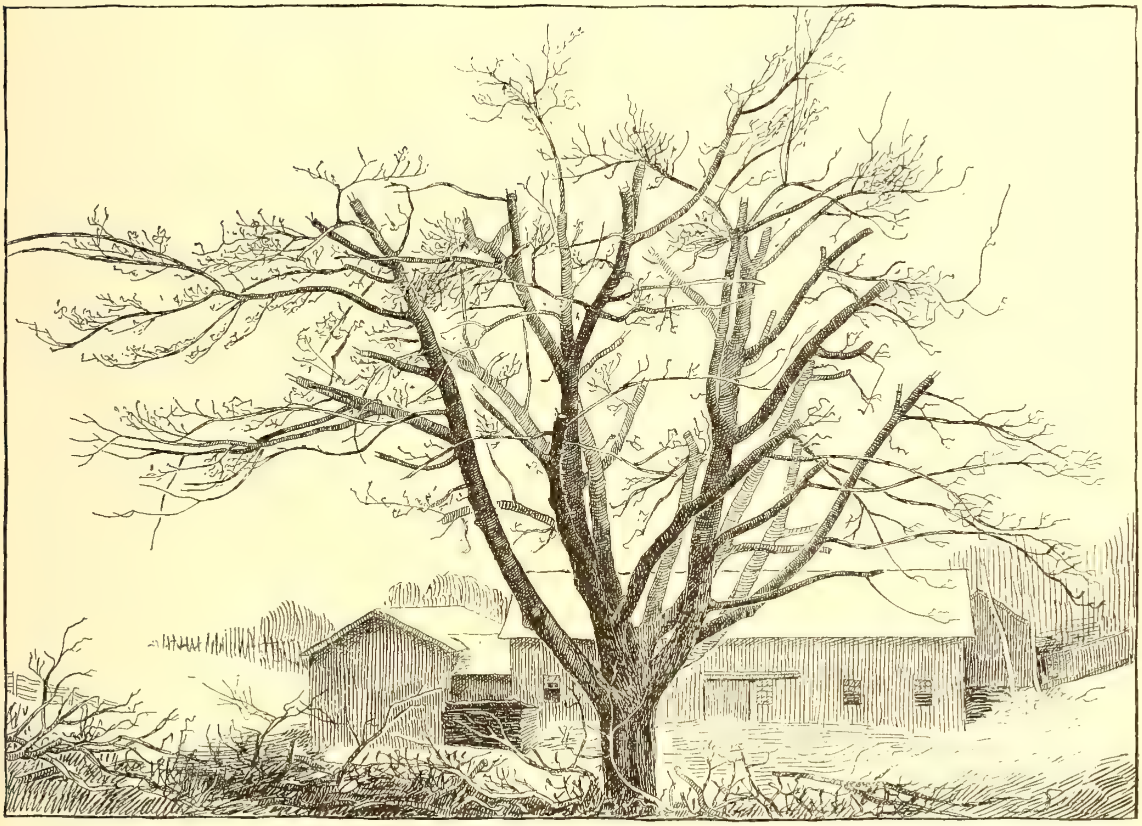


FIG. 2.—TOP-GRAFTED TREE. FIG. I AFTER BEING OPERATED UPON.

A frequent objection to this practice of grafting many limbs is its cost, for grafters charge by the piece. But the orchardist should not hire his grafting done. He should either do it himself or interest his boys in the operation.

This newer system of re-shaping a top is the easiest, safest and quickest way of changing an old tree. I have been obliged many times to regraft trees which had been grafted in the old manner, in order to save them from ruin. L. H. BAILEY.

A LITTLE PLACE IN THE COUNTRY.

Ninth Paper.

SMALL FRUIT CULTURE.

IN THESE papers last autumn we made some suggestions regarding the planting of small fruits. No imperative rule can be laid down as to the proportion of the area which should be devoted to such a purpose in a country place, but, in general, we should say "rather more than less." In some respects small fruit culture will have advantages over the kindred occupation of the vegetable garden. It does not require so much labor, or labor extending over so long a period, and the work is generally lighter, and hence, better adapted to our wants. In former papers we have given hints regarding planting the different fruits, and have laid out—on paper—experimental plots of each in order that we might become familiar with the *modus operandi.* There is more to be learned by the actual handling and planting of a hundred plants than by reading about planting ten thousand. So if our hints were followed last autumn, we shall now know how to go at this work, and how much of it we can safely lay out. In the spring time there is so much to be done that work is very apt to begin to crowd us before we are fairly into it. Especially will this be true if we do not perfectly understand the amount of labor that will be required for carrying out our plans. This is one of the things I know from experience, and consequently I know it thoroughly. It is easy to plan more work than we can possibly accomplish, even upon the smallest of country places.

Knowing, then, the amount of labor and time that will be required, and having had opportunity during the winter to perfect our plans as to the disposition of our available ground, we should commence as early as possible this month and carry the work of fruit-planting directly to a finish. If even so little as two acres are to be planted we must get at it in good season, or the work will intrench upon the time which should be given to the vegetable garden.

The first point necessary for rapid and successful work will be that the soil should be in good mechanical condition. It is slow work trying to set strawberry plants in lumpy earth, and the plants might have a hard time trying to survive in it, if opportune rains should not come, and even the heavier and coarser rootlets of the currant and the raspberry cannot begin pumping life into the plant with much vigor unless fine, moist earth is close about them. Even in April the sun and wind will dry off the surface of freshly worked soil very rapidly, and if we have clay land, a few hours exposure will make the surface like a mass of small pebbles, a condition very trying both to the hands and the temper. The best way is to have but a small portion of the land worked at once, and have the work on this completed a little after the middle of the day. Then with as many hands as are available, set out the plants upon this portion during the latter part of the afternoon, and the early evening. If the planting is not all completed then, it will be found in the morning that the night's dews have freshened up the remainder of the plot so that it may be easily worked. It may take a little longer to complete the work in this manner than if the ground were all made ready at once; but if that had been done and any delay then occurred from not having the plants ready, or through lack of sufficient help, or owing to the interference of a storm, the final result would not be so good. It is not our purpose here to give long technical instructions either in the work of planting or cultivating. For that, each beginner will consult the shelves of his own well-selected horticultural library. But there are a few common-sense rules that even if found there will bear repeating here.

First. Do not leave plants of any sort exposed to the withering influences of wind and sun. It is the fine roots, the delicate spongioles, that are of the greatest importance to a plant at any stage of its growth; but particularly so at the beginning of its new (transplanted) career. These are the only roots that can take the requisite food from the soil, and if these are destroyed no recuperation of the plant can take place until new spongioles are formed upon the larger roots. Thus one may understand how the loss of these will necessarily retard the plant from starting into new growth.

An object-lesson, however, is of vastly more value than anything that can be said on paper. To see just how this operates, take a half dozen good strawberry plants, such as have long, fibrous, white roots, and expose them for a couple of hours merely by leaving them uncovered upon the surface of the ground. At the end of that time compare them with some similar plants which have been protected by their wrapping of sphagnum moss, or by being covered with loose soil. Even the most unpracticed eye can see the change that has been wrought. If this is not sufficient, and to get the fullest possible benefit from one lesson, plant the same roots with all the care and under the same conditions as the others. At the end of the three days, if the ground is moist, or at the end of a week if it is dry, take them up, and it will be seen that they are now just approaching the condition that they were in before the exposure.

What is true in this respect with the strawberry is equally true with all other plants. I have only taken the strawberry as an illustration because the destruction of the spongioles will be more easily apparent to the novice than upon the woodier roots of the cane fruits. But the effect is the same upon both.

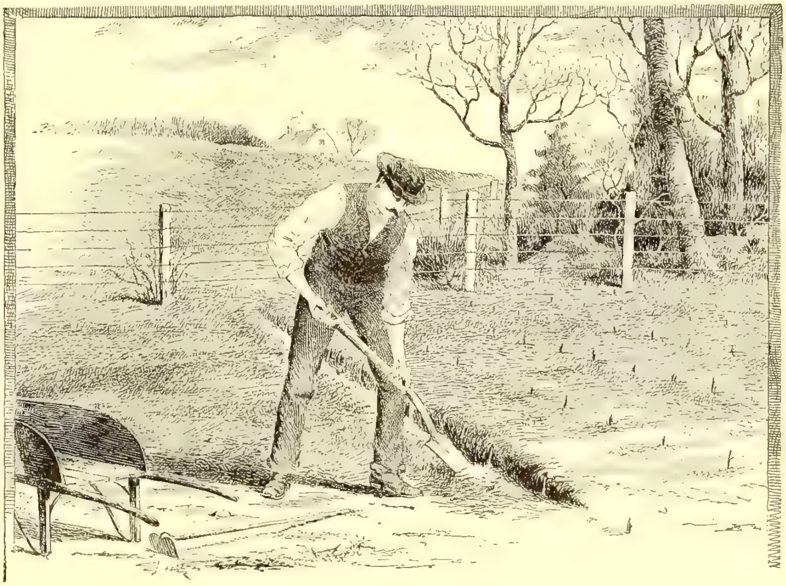
When the plants are wrapped in moss it is best to keep this about them, and keep it moist until you are quite ready to put them in the ground. If they are not in moss, put them in boxes or baskets of moist earth, or bury the roots in the ground close by the point of operations.

Second. In the case of cane fruits, such as raspberry, blackberry, currant and gooseberry, do not leave a long cane when transplanting. We do not want the force of the plant expended in sending up one long, gaunt cane, but in producing a vigorous root-growth, and sending up from the crown a few new strong shoots. Only enough of the cane is wanted to mark the spot where the roots are; six inches is amply sufficient.

Third. These small fruit-plants, although they are to give us no return this season, must have just as good care and just as thorough cultivation as any portion of the vegetable garden. It is only by keeping them clean, thrifty and vigorous this year, that we may hope to get some reward for our labor next.

In determining what proportion of each small fruit to plant, we shall naturally be governed mainly by the question of prospective profit. This is contingent upon so many things that no very definite advice can be offered. All crops that we grow are subject to damage or total destruction from frost, drought, blight and insect depredations.

When one meets with genuine success in strawberry culture, there are few possible crops which will give greater returns per acre. But to attain success one must have good soil, a constant and abundant supply of fertilizers, unfailing moisture from early spring until the crop is gathered, and good markets near by. I mean that these conditions are all essential to the highest pecuniary success. The crop requires rather more work than either raspberries or blackberries, but, on the whole, is ordinarily deserving of more space than either of the others. Especially would this be true at first, as they came into bearing earlier and will be repaying us something while the others are only getting ready to pay, and after two or three crops are taken off, the amount of space devoted to them can be curtailed, if it is found desirable to use it for other purposes, with less loss than if it had been originally planted with slower-maturing fruits.



Our New Raspberry Plantation.

Red raspberries—I would give less space to them than to any other of the cane fruits. I would give rather more to the black-caps, and stlll more to the very best varieties of blackberries. There are few markets in which good cultivated sorts of the latter fruit are often found in sufficient abundance to supply the demand. The wild berries are usually plentiful, and good enough when eaten out of hand in the woods or the berry patch, after a battle with the briars. But notwithstanding all the roromance of the "fruit's wild flavor," they do not compare, for table use, with big, ripe, luscious Lawtons. The cost of gathering red raspberries is a serious drawback to the profits. The larger blackberries fill the baskets so rapidly that the cost is hardly appreciable.

While the fruit garden must claim much attention this month, we cannot wholly neglect the vegetables or we should suffer for it by and by. That part of the garden already planted must have attention. Perhaps the weeds have not started much yet, but if the plants are up the ground must be worked. April showers sometimes come down with force enough to pack the soil pretty hard. The hoe and rake will be constantly needed to keep the surface loosened. Other plantings besides those we instanced last month must now follow in quick succession. Every week from now until midsummer should see something go into the ground, so that as the season progresses we may have, each week, something new for the home table and for market. We shall soon be gathering onions, beets and radishes for market. The ground upon which they are grown should be rich and in good mechanical condition—kept loose and mellow up to the very day these crops are taken off. If it is in such good heart, the very best way in which it can be employed for a second crop is to set plants of early summer cabbage in the rows as fast as any open places are made. The larger roots will be pulled first, and thus vacant places will be made in which plants can be set, sometime before we could wholly clear the land. If plants are set in every alternate row of these beds they could be about the right distance (two feet) apart. The spaces may occur with some irregularity; set the plants as nearly as possible two feet apart in the row, and if the rows are straight one way there will be no difficulty in cultivating them. To have the plants handy, a bed should be sown (in the open ground) as near as can be to the place where we shall use them. Then we can pull one or a hundred plants and set them in as wanted, leaving the ground unoccupied hardly for an hour. If this bed is sown by the tenth of this month the plants will be ready in time, and will mature just in time to follow the first early cabbage grown from hotbed plants. The advantage of having this bed of plants "handy" cannot be too strongly impressed. If it is a long distance away, it will hardly seem worth the trouble to go to it and pull a few plants at a time. But when close by the work will seem so attractive that we shall let very little ground remain unoccupied.

THE OLIVE IN CALIFORNIA.

THE OLIVE industry promises to be one of the most prosperous branches of horticulture in California. The southern counties were at first thought to be peculiarly adapted to the olive, as to the orange, but later experience has very greatly extended the region of successful olive-culture, and trees are being planted, this season, on cheap mountain lands three hundred miles north of San Francisco.

Perhaps too much has been written in California publications about the profits of the olive, and far too little about its food value for home consumption. It is the poor man's tree, at home on rocky hillsides. The Californian laborer of the next century must live somewhat as the Italian peasant does, upon olive oil, grapes and bread, rather than upon butter and meats.

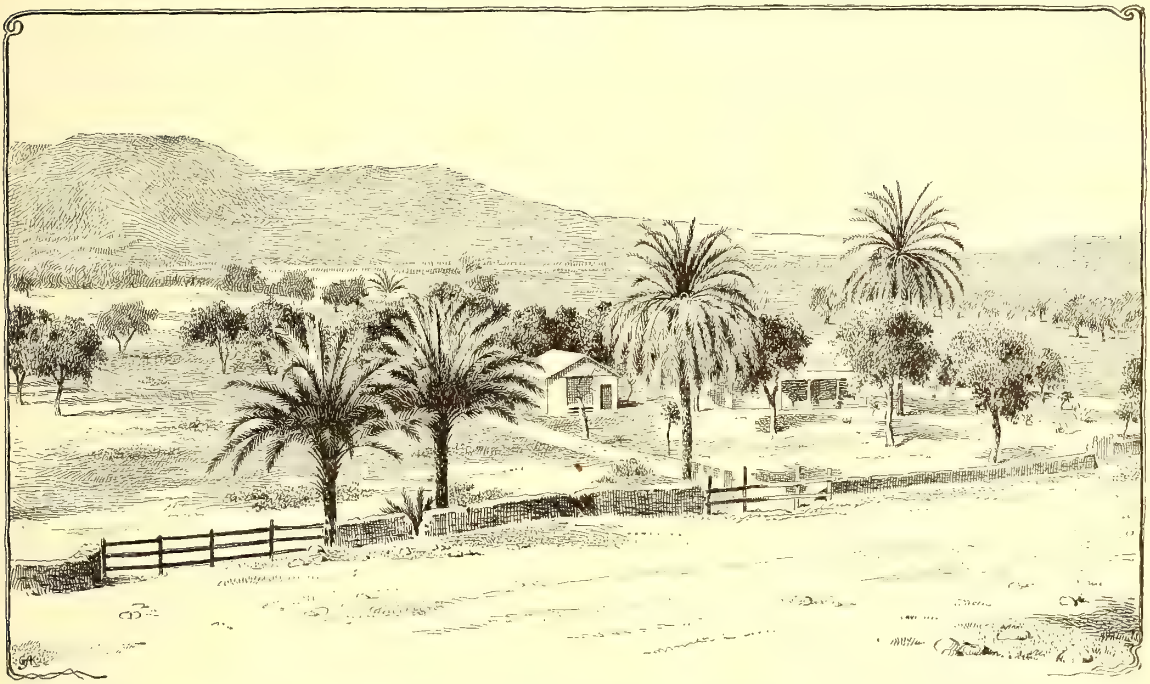
The present condition of the olive industry can be briefly stated. For five years past, every tree that the nurserymen could possibly produce has been sold. Orchards are now planted in at least 30 of the 53 counties of the state. Several prominent growers have gone to Europe to study the choice varieties of the olive. Five or six books on the olive have been published in San Francisco. One of the best of these is Adolph Flamant's "Treatise on Olive Culture;" another is by A. T. Marvin, of the Quito Olive Farm. At least a dozen magazine articles on the olive have appeared in various publications. The reports of the State University, and the Horticultural Board, contain not less than twenty papers and discussions of value to olive growers. The literature of the daily newspaper on the subject is, as usual, somewhat haphazard and misleading, because seldom written by practical olive growers.

The pioneer of the olive industry is Elwood Cooper, of Santa Barbara, a man of great energy and persistence. Mr. Lelong, head secretary of

Horticultural Board, has done much to develop public interest in the olive. W. B. West, of Stockton, the nurseryman to whom, more than any other man, the Californians owe the beginnings of fig culture, was also one of the pioneers in studying the olive abroad, and importing the best varieties. John Rock, the veteran nurseryman, formerly of San José, now of Niles, is probably the leading spirit of the present time in the practical development of the industry. He does not write about the olive, but he has made two journeys to France, Spain and Italy within the past five years, and, like W. B. West, he knows exactly what to look for, and where to find it. Another of the names forever linked with the early history of olive culture here, is that of the late B. B. Redding. He was chief of the Land Department of the Central Pacific railroad, and devoted much of his leisure to horticultural investigations. He made large importations and planted extensively. In 1878 he published a paper on olive culture. The late Dr. Bleasdale, an old priest, whose knowledge of the Spanish, Italian, French and Portuguese literature on the subject was something wonderful, published many papers on the olive, and finally, in 1881, a book.

Elwood Cooper's notable work appeared in 1882, was republished in 1887, and supplemented by other papers in 1888 and 1889. F. Pohndorf's olive book appeared in 1884, aad B. M. Lelong's in 1888. Two of the best of recent publications have been papers by northern Californians, one by S. S. Boynton, of Oroville, in the *Overland Monthly* for July, 1889, another by Mr. Gray, of Chico, which was printed in the state horticultural reports.

Nearly all the olive trees that have yet come into bearing are of the old Mission variety, brought to the coast by Spanish priests more than a century ago. It is a very valuable sort, identified as belonging to the Cornicabra-Cornizuelo group of Spanish olives, and is excellent both for pickles and for oil. It ripens late in the season, is a shy bearer in some localities, and its propagation is somewhat difficult, but even with these drawbacks, it will long be the leading olive of California. An olive of small size, introduced by B. B. Redding, and called the Redding Picholine, is found to propagate so readily that it is used extensively as the stock upon which to bud or graft the finer sorts. The Picholine is often called here the Oblonga. The Pendoulier, Manzanillo, Rubra, Uvaria, Columella, Lucques, Macrocarpa, Oliviere, Saillern, and several other varieties are described, and the

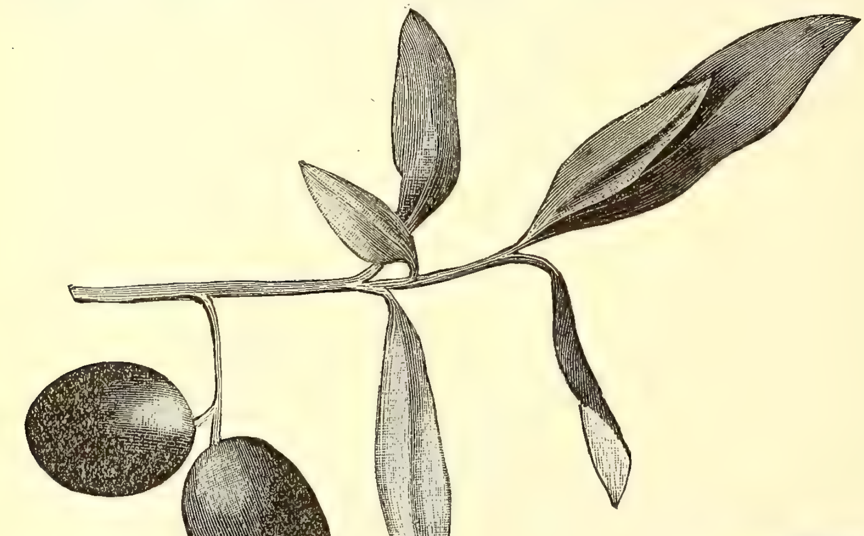


A Typical Bit of Olive-producing Country in Southern California.

Olive trees at the right and in the back-ground.

localities given where they have already fruited, by E. J. Wickson, in his work on "California Fruits."

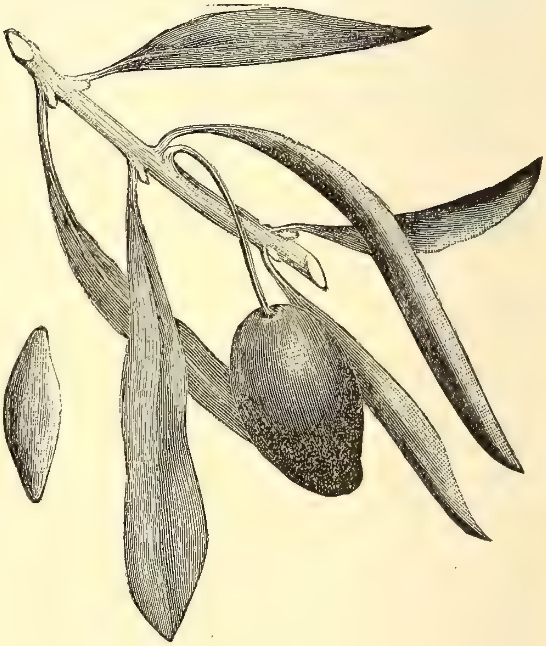
For years the oil of Santa Barbara and San Diego was justly esteemed as the finest, but the younger orchards are gaining rank, and during the last two years an oil equal to the best has been produced in Santa Clara Mission, San José, Livermore, Napa, Sonoma, Butte and other parts of the state.



The Saillern Olive.

The olive requires, so writers say, 7,160 degrees of heat from the time the tree blossoms till the frosts come. At Oroville, Butte county, the average degrees of heat between April and November gives a total of 13,740. The slopes of the Sierras and coast range, as far north as Trinity and central Shasta, are warm enough for at least the early ripening sorts of olive. A little snow for a few days during winter does not injure the tree. In Butte, Tehama, Placer, Yuba and Nevada, all northern Sierra counties, there are now large olive orchards just coming into bearing. Some are on sandy bottom soils; others are on thin red lands, over hard pan, and still others are over limestone, slate, granite, or sandstone rock overlaid with a few inches of light warm soil.

Elwood Cooper, of Santa Barbara, reports an average yield of two gallons of olives from each of his four-year-old trees, and a few of his six-year-olds have even born thirty gallons. Mr. Flamant, of Napa, expects from six to ten gallons from six-year-old trees, worth for pickles one dollar a gallon, which nets him about five dollars a tree, after allowing for cost of picking. There can be no doubt whatever of the earlier bearing of the olive in California than across the Atlantic, as evidence on this point is overwhelming. The eight-year-old California tree yields more than the fifteen-year-old tree in Europe. Some of the old Mission olive trees have yielded one hundred and fifty gallons of berries apiece. Oil pays better than pickling. Elwood Cooper reports sales at from $1,000 to $2,000 per acre, and he thinks these prices will continue. There is an enormous and a still increasing demand for pure olive oil. After making every possible discount for lower prices, the olive is still the most profitable crop that the horticulture of California has tested. Its culture requires capital, patience and skill, but the rewards are commensurate, and greater than for other fruits.



The Picholine Olive.

All the writers whose books I have mentioned, unite in predicting a future for the olive in this state, beyond that of almond, fig, walnut, orange, lemon, or grape. In five years more, the trees now planted will attract attention, and begin to produce an effect upon the American markets. In Butte county alone there were 54,600 olive trees planted in 1887–88 and 1888–89. This winter in that county 30,000 more trees will be planted. There are no reports which give the exact acreage in olives in the state, but it cannot be far from 16,000 acres, representing a million and a half trees.

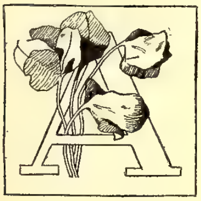
The best pickled olives of California are, as yet, seldem in market. They are an essentially home product, made from a few trees in the garden, and used on the owner's table. The typical California five-acre homestead has a dozen olive trees, whose fruit is pickled, not green, but when nearly ripe, and used as daily food. Mission olives, properly treated, make a pickle far superior to any imported olive. Some of the new varieties will be even better for the home supply. But with oil making, the orchard ought to be large, and even then it would be best to sell the olives to the oil mills, unless the same skill and judgment that go to the making of fine wines can be obtained.

The olive trees that still stand about the mission gardens rank among the most picturesque memorials of the last century. I have seen a great many of them, sometimes alone, sometimes grouped with oranges and palms. At the old San Diego Mission they stand in long avenues on the river bottom below the ruined adobes—grand trees, a hundred and twenty years old, wasted by fire and axe, but wonderfully fruitful, and noble in their neglected disarray. The old olive avenue behind the church at the Mission San Josè, in Alameda county, some 35 miles from San Francisco, marks another of the famous priest-gardens of the past. In this old grove there are several varieties of olive, some of which ripen much earlier than others. Olives were planted by Spaniards in many other places. Old trees often stood on the larger ranches. I remember seeing olives beside the broken walls of lonely adobes on some of the famous ranches of Santa Barbara and San Luis Obispo—olives as enduring as the live oaks, standing in the midst of wide, untilled pastures, to mark the fallen homestead of some Spanish gentleman.

If a group of capitalists were looking for a safe and permanent investment, they could find nothing better in California than the planting of a large olivarium or olive orchard. It ought to be cheap mountain land, costing not more than ten dollars an acre, planted with the best varieties, and carefully cultivated. With a practical manager, no better dividend-paying investment could be found in the United States.

California. Charles H. Shinn.

A PROTEST AGAINST THE "NOVELTIES."



ALTHOUGH I have been many years in my present business, and have had much experience in selecting seeds, yet there is no part of my entire year's work that I attend to with such a dislike, as the selection of seeds and plants. There is occasionally a new variety of either vegetables or fruit that is a decided acquisition, and we are perfectly willing to pay something extra to get it. But what about this endless host that come and go like summer showers? How shall we tell whether we are getting something really valuable or something that is even poorer than the old standard varieties? I confess that I cannot tell; and after studying a great number of catalogues, and selecting a few of the new varieties of seeds or plants, as a general rule I find at the close of the season, if not sooner, that I have made a mistake, and that the so-called new sorts are not so good as old friends. I know of but one way to do, and that is to stick closely to the old standard varieties.

Take the strawberry as an example. I got a few Wilson plants in either 1860 or 1861. I soon found that valuable as they were, and still are, where they are properly cared for, they were not absolutely perfect although they were a great improvement over any variety then in existence. Soon new varieties came with every spring and fall, and I commenced buying and testing them; and scarcely a year has passed since that time, that I have not plowed under from one to a dozen new varieties that I had spent time and money upon. To-day I can say that I have never had any strawberry plants that were equal to the Wilson, in all respects, unless it may be some of those I am now testing.

Let me be distinctly understood. I do not object to new and *valuable* varieties, but I do object to such an avalanche every year, with so small a proportion of any true value.

Wisconsin. J. M. Smith.

TARRYTOWN LETTERS—VI.

BY A. B. TARRYER.

A CHAPTER ON WEEDING AND WEEDERS, HUMAN AND IMPLEMENTAL—MRS. TARRYER AS A WEED EXTERMINATOR AND TRAINER OF FARMERS' WIVES—GETTING NEAR TO NATURE—OLD LOUDON AND MRS. TARRYER DO NOT AGREE.

ALTHOUGH inclined to stoutness—the only thing she is jealous of except creeping intruders in her garden—Mrs. Tarryer is a great weeder. She is none of your stooping, unseasonable, thumb-and-finger weeders, either; but on time, a stand-up, knock-down and drag-out fighter, with fit weapons of the Joshua and Gideon pattern—revertible and with certain improvements. She knows as well as they did that weeds can be exterminated, if gardeners will mind their business early and late, and quit raising and scattering weed-seed on their neighbors.

To provide good company for herself, and helpmeets for worthy young men of her acquaintance, she takes choice girls into her kitchen—that being the holy of holies for a family. In this way she gets leisure to see to her garden. She is so certain to have her cooks and laundresses fluttering their afternoon ribbons out in it—quite leisurely—that it seems, sometimes, as though she was running a female agricultural college to train wives for farm missionaries among the experiment stations.

Her weight everybody else thinks is just about right. She keeps it down by tempting other people to eat heartily, or by weeding two rows to others' one in the garden. She started that with women and children, precisely as our factories, villages, and greatest centers of business were started. The more lovely young women she had, the more well-behaved young men gathered around her and the more she enlarged her garden. By furnishing tools they could own and use for themselves, while they were transacting their little and great personal and social preparations for regenerating the world—all under one—she always kept her garden in order.

Weeding began in March and ended, in the garden, sometime in December. In those days I had to keep the horse-hoe running AFTER the necessary hand-weeding had been done. Mrs. Tarryer was too good a general to deploy her forces among fine loose earth, to the needless making of tracks and the dusting of stockings. She had tools for picking out weeds in wet weather and between showers. She considered the cases of the young men who were liable to drop into the garden for an hour or two, in fine weather, and being paired off, perhaps, with expert and trusty maidens, among such or such weediness (a most beautiful scene!), might have their neatest garden-trousers and fair weather slippers on—unless the lads went barefoot by special permission, among delicate strawberry runners or for coolness. There were reasons of culture, also, and nitrification as well as weed-killing, why loose earth should not be trampled like pressed bricks, and why Mrs. Tarryer preferred small feet in her garden.

During heated terms, days' works were often done before breakfast, partly on account of freckles, sure to poke into the closest sun-bonnet, where a girl was any way sandy, and partly to see whether young men would rise early upon occasion. On hot and dewy mornings, in the midst of haying, or when from catching weather, or any other reason, young men were not much expected, it was rumored that Mrs. Tarryer would kick her shoes and stockings off for the luxury of feeling the cool loam. She had no reason to be ashamed of her under-pinning, and people who have never seen neat toes peeping in and out among strawberry-vines, with brown earth or pine-straw-mulch for a back-ground, would be surprised to observe how much superior they are to dull sunrises.

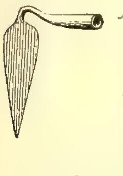
In her way of making an out-door pleasure, and a study in biology and natural history for young people, of weeding, the form of her tools was a very important question. She spent years of thought and severest labor upon it. Being far-sighted herself and inclined to embonpoint, as before stated, she did not squat to weed, saw no reason in her young days for other people doing so, and contrived her tools accordingly. Shrewd metropolitan managers find that the most intellectual and gentle-manly tramps will break stones in the streets like good fellows, if given hammer-handles as long and lithe as billiard-cues. Mrs. Tarryer never speaks of woman's "position"—she takes that for granted, in the garden. She has seen the lines of Milton:

> "Him there they found,
> *Squat* like a toad, close at the ear of Eve."

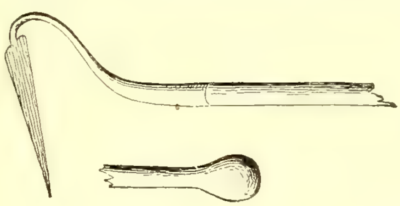
and trains young women to stand like weed-destroying athletes, and work at it as if they were determined goddesses governing the world! Now and then a girl in her kitchen needed specs to pick over beans nicely; but when it came to weeding garden Mrs. Tarryer would choose the openest labor for these and have them attended by chivalrous and eagle-eyed champions, who would see that their neighbor's rows were hoed, too. Not till she came to the use of glasses herself, for fine print, was she aware of the grand compensation in the fact that the visual focus of near-sighted persons extends as they grow older, and how by that means matches can be so arranged on earth as to keep keen eyesight for all distances in the family.

Literary people, who are only clerks, the same as I am to Mrs. Tarryer, and Plato was to Socrates (the philosophical side of Zantippe), will make a regular muddle of right and wrong, as Plato and the clerks who attempt to follow him make of it, without a woman's counsel. We must be sharp to see how, from the beginning, and always, if any one shows truth in the garden, liars—curiously like "lawyers" already, in common speech—will squat around and deny it. We may have keen tools for weeding, but only the usual proportion of day-light; and there will continue to be in every family undeveloped and over-developed members, who will need to be told what are weeds and how to run them out or force them to change their natures. Gardens, with men and women in them, were established for this business in the first place, and never, as some people suppose, for weeds to flourish. Those are always contraband, no matter what the lawyers say.

Among Mrs. Tarryer's first studies of weeding-tools for herself, when people were learning to buy instead of making what they want in this country, she had a *bayonet-hoe in its rudimental modern trade form* presented to her by a dealer as an imported article, costing 75 cents at retail, without a handle. It had a socket that wouldn't hold a handle securely, no goose-neck, and a blade that would hold neither edge or point. Made of iron or low steel, by clumsy hammer-smiths, it had the air of reversion from a good thing in the hands of generation after generation of mechanics who didn't know or care what they were making it for. Arts are lost when we sequester them from the land they were meant to decorate; as religions change so their own grandmothers wouldn't know them, when transplanted from the soils and seasons they were meant to serve. The make of iron candlesticks, fashioned after one of the seven of the altar, still goes on, but their real use now is in pork-factories. Trade tempted from teaching is to blame for these degradations.



Mrs. Tarryer bothered me a good deal with that bastard bayonet, made so as not to arm the peasantry. In the course of 25 years she stood over as many blacksmiths, keeping the old trade-sample as a model of how not to do it, until what she calls the *bayonet-hoe of the renaissance* was elaborated. This was duplicated by the force of one of our great corporations—the same that made John Brown's pikes for him—in considerable numbers. Since that time it has been waiting for wholesale orders; and meanwhile the country has been filling up with kentledge of the old clumsy patterns, fit to prevent intelligent women or men either from going into the garden—except "as an example to the children."

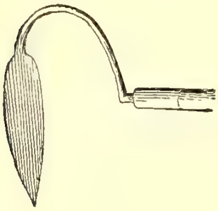


As an implement of peace the bayonet-hoe must be far older than the bayonet of Bayonne, or than fire-arms, or cross-bows, and as old as any fine implements of warfare, for men never learned to fight weeds or weedy mankind really well till they had beautiful gardens to fight for. This new bayonet-hoe, with its graceful goose-neck, throwing the handle so as to work on the central resistance of the blade, which is but the keenest form in steel of a rigid fore-finger; and furnished with a knob-hilt that is a ball-and-socket joint in the hand, related to the skin of the palm as the pulley is to the belt; is, altogether, when thoroughly wrought in two sizes, the perfection of hand-weeding tools for all work. It is fit for the most delicate touches next to plants in the seed-bed, and for deep digging and uprooting there is nothing that can be applied so effectively and rapidly with so little power.

For the heaviest work, Mrs. Tarryer believes in men to a certain extent. I've seen her pile three or four of her hoes, such as he had never seen before, on the shoulder of a new hired man, meeting his puzzled look by telling him to "go out in the garden, but see that you don't do any mischief till I come." Within a week that man would be explaining to some acquaintance that he could do four times more business in a day with those hoes, among all sorts of crops, than with any tools he ever saw. But we change man's religion if we give him new tools—hence we are very cautious, and keep buying the old things that incline us to hope for some better word than this.

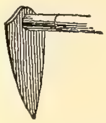
"Come, girls!" Mrs. Tarryer would say some cool morning after breakfast, "it is a good day for *Rumex** and *Repens!** Take an extra hoe or two along with you for company!" So she would "give the bayonet" to the creeping-roots of the plants mentioned, marching over 12 or 15 acres of garden, in a way said roots would not forget for weeks. Her days of judgment for weeds came often and were followed to extermination.

When Mrs. Tarryer found the self-same bayonet, in effect, that she had wrought so faithfully by twenty-five years' practice, in Loudon's "Agriculture" or "Gardening," she was delighted. She greatly prefers to have decrepit old book authority on her side, whenever it happens to know enough.

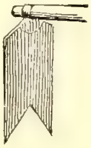


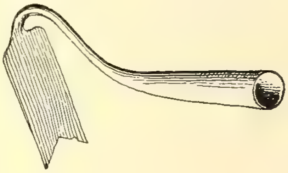
This was *Lord Vernon's* or the *Spanish* pattern. That origin would take us among the exquisite Moorish artisans, who inherited the crafts of the Orient, so that we may reasonably presume the mountain green Amytis of Babylon, who would have her garden set up where she could air herself, had nearly as good bayonet-hoes as Mrs. Tarryer's. She was as pleased with the finding in Loudon, as by Dr. Warren's showing in "Paradise Found" that Homer knew the world was round rather better on the average than we do.

Loudon wrote "for his keep," they say, and must have been kept rather short by his publishers and readers, or he would have handed the bayonet-hoe down to us in better working shape. This is one of his *ancient emblems*, a blasted bud of British handicraft, and the same thing has been repeated in stupid American manufacture—the progeny of Yankee book-worms crossed with the abortive imaginations of mechanics who never had a decent garden.



Another of Mrs. Tarryer's recreations appeared in Loudon in this shape seventy-five years ago. It is evidently intended as a *plantain weeder*, copied and degraded by dim art, working for generations with uncertain hammer and pencil. Mrs. Tarryer hails THE AMERICAN GARDEN to the revival of these beneficent antiquities. Years ago she had the same conception in far more perfect form for weeding grass-plats and door-yards, and as a *lawn-weeder*. One time I had forty acres of old pasture under treatment, when it sprang thick with mulleins and the neighbors were laughing at us. But she set me to cutting old hoes down to the above pattern, and one day in May when it rained so it wouldn't do to have creatures out, she borrowed seven umbrellas and packed eight or nine of us off bare-foot and with trousers rolled up to cut those mulleins. The state in which Mrs. Tarryer performed this exploit is reckoned by the census to contain so few "women engaged in agriculture," that no doubt she was the only one counted. Mrs. Tarryer thinks the next census will find more women in the garden.





Not much can be done about these things till trade and manufactures get clearer views from an indignant public of the art of hand-weeding. Yet we can at least refuse to buy the hoes that have no socket to hold a decent handle.

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*Sorrel and "grows-through-potatoes grass."—Ed.

HARDY HERBACEOUS PERENNIALS.

A CLASS FAST INCREASING IN OUR GARDENS.

PROPER time for planting herbaceous perennials is largely consequent upon the soil and the climate. Generally speaking, the mass of vigorous-growing ones may be planted at any time after growth is nearly matured and while in a dormant state. With skill and extra precautions, many that may be lifted with balls of earth, so that their roots will not be injured by removal, may be transplanted at any time short of, or soon after, the period of their greatest activity. Many bulbs, especially lilies, if carefully lifted and if the balls are preserved, may be managed in this way even when in full flower; but such a course is not advisable, or often necessary; but the knowledge that it is practicable may ofttimes prove valuable. For purposes of propagation, our rule is to take up, divide and replant as soon as convenient after the first frost in autumn.

If hardy herbaceous plants are grown in pots—as they should be for the trade—then they can be put out in the spring, or in fact, at any time without fear of loss. Our methods, or rather the method of planting in this country, is to make the garden in the spring, and what is not planted then is not likely to be planted at all. This, of course, does not apply to large gardens where a skilled gardener is employed; in such places the best time is always selected for such work. The following species and varieties should be found in every garden, and planted whenever opportunity affords; they will keep up a constant supply of flowers from May until December.

AQUILEGIA—THE COLUMBINE.

This is a showy and interesting group. They are all of moderate height, neat in habit, possessing beautiful foliage, and in most cases the flowers are bright and pleasing and their structure is quite interesting. There is a large number of species, but many are not distinct, or at least, their specific characters are not well defined. For ornamental gardening but few species are required, as these unite in themselves the best qualities of the family. They are plants that thrive in almost any situation, though they prefer a moist, rather heavy soil. They are found growing naturally in rocky, moist situations, but they will grow in light, sandy or even gravelly soils, though their flowers will be smaller and deficient in that density of color so manifest in the species. They are readily propagated by division either in spring or autumn, or they can be easily grown from seeds; and if these are sown in boxes in the house or in a hot-bed, and the plants are then transplanted into the open border in June, they will flower the same season.

A. Alpina (Alpine columbine) is a native of the Swiss Alps, and one of the best, because of its free-flowering habit. It grows about one foot high, with a large tuft of finely cut leaves at the roots, and rather erect, leafy stems, producing numerous purplish-blue, white-centered flowers.

A. Californica (Californian columbine) is one of the strongest and most beautiful of our native species. It has a tendency to send up one strong woody stem, which, under favorable circumstances, will reach a height of three feet, producing an immense number of flowers. The sepals are orange colored and blue-pointed, being closely pressed to the petals, which are also blunt, giving them the appearance of having been cut with a pair of scissors, which gave rise to one of the specific names, *truncata*.

A. Canadensis (Canadian columbine) is a species indigenous to the northern states, growing abundantly in dry, rocky uplands. It is a tall, rather graceful species, growing about two feet high, with loose panicles of flowers, bright red, shaded with orange in the centers. Although a native plant, which makes it common, it is one of the most beautiful and showy of border plants.

A. chysantha (Golden columbine). A native of the Pacific coast; is a tall, vigorous and beautiful species, with clear yellow flowers with a long spur. This species comes into flower nearly a month later, and continues to bloom for a much longer period than any other of the family.

A. cærulea (Rocky Mountain columbine) is a distinct species, and remarkable for its beauty. The spurs of the flowers are almost as slender as a thread, about two inches long, with a tendency to twist around each other, and with green tips. But it is in the blue and white erect flower that the beauty lies. Although a perennial in its native habitat, it does not prove so in the east, and should be treated as a biennial. The seeds should be sown in a cool frame as soon as ripe, and the plants be slightly protected during winter and transplanted into the open border in May. It flowers in June.

A. glandulosa (Altaian Mountain columbine) is a remarkable showy and free-flowering species when planted in a congenial situation, which must be moist and shaded. Being a native of Siberia, it will not endure our summer's heat. It grows about two feet high, with abundant foliage; the flowers are very large, blue and white, and have very long spurs, a beautiful feature of the columbine.

A. Jocunda is an intermediate form between *A. Alpina* and *A. glandulosa*, both of which it resembles. The flowers are bright blue, tipped with white. It is perfectly hardy.

A. vulgaris is a native of Europe, and the most common in cottage gardens. It is variable in its character under cultivation, and many beautiful and some extremely curious varieties have sprung from it, particularly the double forms; of these there are white, pink, lilac, blue, purple, dark crimson, red, yellow and variegated colors, which are exceedingly valuable in the natural arrangement of flowers.

ACHILLEA. Of the genus, all that is desirable and all that is indispensable in a collection of hardy plants, is the species, *A. Ptarmica*, variety *flore pleno*, which is one of the best hardy white flowers known. It grows about two feet high, branching, and if kept cut, will produce from June until October, trusses of white flowers that are useful in any floral arrangement. This plant is perfectly hardy, increases rapidly, and will grow anywhere.

ACONITUM (Monk's-hood) makes a stately clump, particularly adapted for shrubbery borders or any situation where a tall-growing, dark flowering plant is wanted. *A. Napellus*, which, in a favorable spot grows five feet high, is one of the best species. It is perfectly hardy, and is freely propagated by division of its tuberous roots.

ANEMONE. Of this numerous family there are almost innumerable species and varieties. *A. Japonica*, a tall autumn-blooming species, is the best. The flowers are large, rose-colored, and the plants are strong growing and branching. A variety of this, named Honorine Jobert, has pure white flowers; beautiful and effective. Both of these should be grown in quantity for cut-flowers in autumn, and there are but few more beautiful subjects.

ANTHERICUM. Of this species of liliaceous plants, *A. liliastrum* (St. Bruno's Lily), is a grand plant for summer flowers, which are pure white, two inches across, and produced in long spikes like the early gladiolus, only the flowers are more scattered. This plant increases rapidly, and takes kindly to division. It should have a moist situation, and requires a mulching of leaves both in summer and winter to protect it from cold and heat.

CLEMATIS. This genus affords many of the most desirable plants in cultivation for trellis or pillar decoration, and none are more valuable than some of our native species. Of these, *C. flammula* (the Sweet-scented Virgin's Bower) is to be greatly admired for its grace of habit, delicious fragrance and poetical associations. *C. recta* (Upright Virgin's Bower) is a grand border plant, growing from two to four feet high, with dense panicles of small white flowers in early summer.

COREOPSIS LANCEOLATA is a generous flowering plant, and has no superior in the garden. The flowers are rich yellow and produced in abundance. It can be treated as an annual if desired, but it flowers as early from seed and continuously in either case until killed by frost.

DELPHINIUM (Larkspur). The perennial, or Bee larkspurs, have no rivals in the hardy border. They grow anywhere, but prefer a deep, rich and moist soil. If cut back immediately after flowering, they will flower again in autumn. Seeds sown in a hot-bed in early spring make charming flowering plants in autumn. Among this class the florists have made great improvements by cross-fertilization. Now we have every shade of color that white, dark blue and purple will produce. While we prefer the dark blue with a white center, all the varieties are desirable.

DIELYTRA (Bleeding Heart) is an old garden plant that everybody knows, and a grand plant it is, particularly in heavy soils, for there the flowers have more color and the racemes are longer. It is rapidly increased by division in autumn. *D. eximium*, a native species, is ever-blooming, and the foliage is nearly as handsome as that of the Maiden's Hair fern, which makes it one of the most desirable border plants.

DIGITALIS (Fox-glove). Some of the many varieties are very desirable, and worth growing.

EULALIA, an ornamental grass from Japan, is valuable for clumps or masses on the lawn, and the plumes are first in the list of ornamental grasses for bouquets in winter. *E. Japonica variegata* has firm but graceful leaves, alternately striped with green and creamy-white. *E. Zebrina*, or Zebra Grass, in in all respects similar to the former, excepting that the alternate stripes run crosswise, and varying in width, give the plant a very singular appearance. When grown in deep, rich soil and well established, the plants will attain a height of from four to six feet.

HELIANTHUS MULTIFLORUS. The double-flowering form of this is decidedly the best of the sunflowers, and is a plant well worthy of a place in the border. The claim that it is hardy is not well founded. The roots should be wintered in a cold-frame or greenhouse, and divided in the spring when planted out. It is advisable to cut a portion of the plants well back about the first of July, as this will extend their period of bloom.

FUNKIA SUBCORDATA is a grand border plant, popularly known as Day Lily. It must be well established to flower well; then it produces its pure white, fragrant flowers in profusion. After planting it can remain undisturbed for years.

HEMEROCALLIS FLAVA, the best of several species, is a fine hardy plant with clear yellow, very fragrant flowers, produced on long, slender scapes in June. These handsome lily-like flowers are very useful for cutting.

HIBISCUS. These showy plants are only suitable for large borders or for massing. *H. Moscheutos*, a native species, common in marshes along the sea-coast, is a noble plant. The flowers are six inches, across and of a bright rosy-pink. Although a native of marshy districts, it improves by cultivation on dry soils, *H. Californica* is a strong growing species, producing large, pure white flowers. All the varieties are propagated readily from seeds, and the plants can remain undisturbed for many years without injury.

LILIUMS of every denomination have their home in the border, some doing well, others fairly well, a few not well at all; while all thrive in places suited to them, all will not do equally well in the same soil and situation. Plant such as are congenial to the place you have for them, and these will embrace at least a majority of the species.

Platycodon grandiflorum. This genus has been, and still is listed under a variety of names, campanula, wahlenbergia, etc.; but it has no superior in the border. Its flowers are about two inches across, of purple or white, and of both double and single forms. It is readily propagated by division or from seed.

Spiræa. There are several herbaceous spiræas worthy a place in any border. The best is *S. Japonica*, known also as astilbe and hotiea, which grows about two feet high, with branching spikes of pure white, feather-like flowers. *S. lobata* (Queen of the Prairie), a native species, is one of the most stately of the spiræas. The flowers are very handsome, of a deep peach color, and produced in clustered panicles on long, naked peduncles.

Tricyrtis hirta (the Japanese Toad Lily) is an indispensable plant for the hardy border, as its flowers are the culmination of the season, appearing with the first frost, which, if not severe, does not injure them. They are axillary, produced in panicles about six inches long, bearing from their peculiar markings the appearance of orchids. The plants may be taken up when the flowers first appear and put in pots or boxes, and they will develop their flowers perfectly in the house, after which they may be returned to the border.

Trillium (American Wood Lily, Indian Shamrock, Three-leaved Nightshade). A deep, well-drained bed of peaty soil, in a somewhat shady position, is the most suitable for these plants. Plenty of water is essential in summer. The varieties grandiflorum (see illustration, page 213), erectum, cernuum and sessile are all desirable and can be readily cultivated in the north.

Yucca filamentosa (Adam's Needle) is an evergreen perfectly suited to the herbaceous border. The flowers are produced on an erect, branching spike from four to six feet high, proceeding from the heart of the plant. It is not uncommon for a single spike to furnish 300 blossoms, which are creamy-white and three inches in diameter. The variety is propagated by offsets or from seeds, the plants of which flower the second year.

OLD GARDEN LORE.

IN Gerarde's quaint old Herbal, published in 1597, we find some amusing descriptions of our well-known plants, together with a table of "virtues," that are, to say the least, interesting reading. As an example, we quote his description of Indian corn and its "virtues," corn being known at that time as "turkey wheate." He says: "Turkey wheate doth nourish far less than either wheate, rie, barly or otes. The bread which is made therof is meanly white; it is hard and dry as bisket is, and hath in it no clamminus at all, and for which cause it is of hard digestion, and yieldeth to the body little or no nourishment. We have as yet no certaine proofe or experience concerning the virtues of this kind of corn, although the barbarous Indians which know no better, are constrained to make a virtue of necessitie, and think it a good foode; whereas we may easily judge that it nourisheth but little, and is of hard and evil digestion, a more convenient foode for swine than for men."

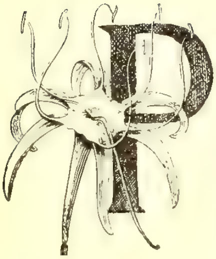
Of garden radishes he says: "Radish are eaten raw with bread instead of other foode; but being eaten after that manner, they yield very little nourishment, and that faultie and ill. But for the most part, they are used as a sawce with meats to procure appetite, and in that sort they engender blood less faultie, than eaten alone or with bread onely; but seeing they are of harder digestion, they are also many times troublesome to the stomacke; nevertheless, they serve to distribute and disperse the nourishment, especially taken after meate, and taken before meate, they cause belching, and overthrow the stomacke."

It is very important to know that "the roote stamped with hony and the powder of a sheepe's hart dried, causeth the hair to grow in short space;" also, "that the roote stamped with darnel and a little white wine vinegar, taketh away all blue and blacke spots, and bruised blemishes of the face."

The virtues of the *Lilium Martagon* having not then been discovered, Gerarde says: "There hath not been anything left in writing either of the nature or vertues of these plants; notwithstanding we may deeme that God which gave them such seemly and beautiful shape, hath not left them without their peculiar vertues; the finding out whereof we leave to the learned and industrious searcher of nature."

He cautions us against the use of leeks, saying: "It heateth the bodie, engendreth naughtie blood, causeth troublesome and terrible dreams, offendeth the eies, dulleth the sight, hurteth those that are by nature hot and cholericke, and is noisome to the stomacke."

SEA DAFFODIL.



PRETTY as a picture is this beautiful bulb, which is hardy south of Virginia, and variously known as hymenocallis, pancratium, Spanish Lily, Spider Lily, etc. It is one of the most desirable "novelties" I have grown for some seasons. Last spring 100 extra large bulbs were sent to me, many over the size of a pint cup, and after I had sold all I could, I planted the remnant late in May, and by August the plants were in full flower. I was astonished and delighted with the result. From August to hard frost the bulbs constantly bore great masses of fine, waxy white flowers, so fragrant that many objected to the odor as some object to that of tuberoses. They are also very peculiar in structure, each plant being furnished with one thick, strong stem, surmounted by clusters of blooms, often 25 to a stalk, which commence to open, a few each day, until the whole are expanded, the flowering period of one stalk being in this way extended from ten to fourteen days. Each bloom is single, with an expanded center much like a Morning Glory (convolvulus), but with long, slender, strap-like extensions or elongations from the outer edge, which is in five sections, and these give it an exceedingly quaint and attractive appearance. From the parent stalk one can strip a single flower furnished with a stem and tube fully 5 to 8 inches long, so that it can be easily arranged for cut-flowers, giving an exquisite grace to any design. This Sea Daffodil is a native of the South, growing most readily in low, flat, undrained lands, but it readily adapts itself to any or all situations. Especially will it delight the amateur, as it can be potted, and with a little care, will flower in from two to six weeks. At the Centennial Exposition bulbs of this kind readily sold for $1.50 apiece as Spanish Lilies, where the shrewd dealers kept a succession always in flower, which needed only to be seen to find eager purchasers. I would hesitate to say how many flowers my small bed, 4 x 18 feet, bore last season, but there were enough to make it quite an easy matter to pluck from 5 to 10 long stalks per day for my friends, always leaving many unplucked stalks.

South Carolina. J. S. R. T.

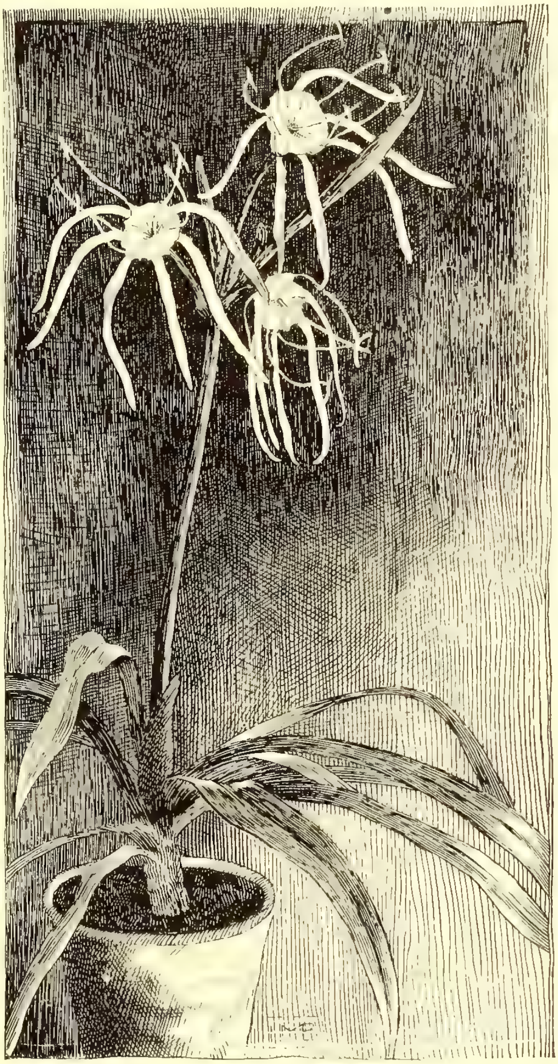
[It is evident that our correspondent refers to either the *Hymenocallis Harrisiana* or *H. rotata*, both natives of the south, the former of Mexico and the latter of Florida, and both also remarkably pretty. The cultivation of these and several other species of the genus is not so extensive as it should be, especially in the warmer sections of the north, where it can be easily grown especially if the bulbs are stored in sand in winter as recommended for other bulbs. When grown in pots in the house the several species of stove and greenhouse varieties require a strong loamy soil, well drained, and a liberal allowance of pot room. The bulbs must be buried under the soil, as shown in the illustration (page 209), and always kept moist.—ED.]

PROPAGATING DRACÆNAS AND NEPENTHES.

Dracænas require strong heat and abundance of moisture. Various methods are in use in propagating them. Old plants frequently become too tall to be entirely satisfactory, as their habit of growth produces a long, straight stem, destitute of leaves except near the top. It may then be desirable to get the tops rooted in small pots, making lower plants, which are more attractive and more easily handled. One method is to saw a pot in halves, then bring the halves together, enclosing the stem a little below the base of the lower leaves. Bind the pot together with wire. It may rest on a platform, supported by stakes set in the soil of the larger pot, or be held in any convenient manner which will keep it securely in place. The pot is then filled with soil, placing a little moss in the bottom in the ordinary manner, and is kept well watered to induce roots to form. Slits may be made in the bark or an incision made part way through, and lengthwise of the stem, as a means of facilitating root growth.

On January 13 a plant of *Dracæna Goldieana*, layered in this way October 21, was examined, and also one of *D. terminalis*, which was layered December 4 by bending on a piece of tin in the shape of a funnel and fastening it around the stem with wires and stakes. Neither of these gave any indication of rooting, while two cuttings of the latter made at the same time, December 4, were rooted nicely. These cuttings were made by cutting off the tops just far enough below the leaves for a sufficient stem, then set in 3-inch pots and placed in the propagating case. The older stems of the plants were cut into pieces from one to two inches in length, placed in a 6-inch pot of light soil and covered with sand. The shoots from these were also to be seen at this date.

December 11, two top cuttings were put in 3½-inch pots. One showed roots January 15, and both were nicely rooted January 27, with strong, healthy roots circling around the bottom of the pots. Several of the inner leaves of the plant of *D. terminalis* layered in the tin funnel from December 4 to January 13 had partially shriveled and died. At the latter date these leaves were cut away, the funnel removed, and the top cut off and simply set in the moss in the propagating case, without any soil whatever. January 27, only twelve days afterward, it was breaking for roots, and January 31, there were roots one-fourth to one-half an inch long. The same day, January 31, a cutting of *D. Youngi* was put in the moss in a part of the propagating case which receives somewhat stronger bottom heat. The bark at the base of this cutting was slit with a single cut of the knife on two sides, and on two other sides a narrow strip was taken out. February 7, just one week afterward, two roots had formed well up the side of the stem. The bark at the base of the stem was breaking for roots between the cuts, but showed little or no signs of rooting directly from them, indicating that these were rather a disadvantage than otherwise.


The Spanish Lily, Hymenocallis.

February 12, a plant of *D. braziliensis*, which had been layered two months in a pot sawed in halves, was examined and showed no signs of rooting. One plant layered in this manner has produced roots, as can be seen by digging into the soil.

From these trials it would seem that cuttings are preferable to stem-rooting by layers, if a suitable place for propagating is at hand, it being much quicker and equally certain—not a plant or even a leaf having been lost from any of these cuttings, except from the one first layered in tin. Probably rooting would be more certain with an incision half way through the stem, diminishing the flow of sap somewhat; this was not done in most of these cases. Partially girdling the stem just below the pot might produce the same effect. Keeping the soil about the old roots dry and that in the upper pot moist would also be likely to aid in the formation of roots there. By this treatment we have the top of our plant as handsome as before, not a leaf being lost in the operation, with the additional advantage of a low plant in a small pot, with young, vigorous and healthy roots.

The propagating case used in rooting such plants is a very useful and very simple affair. It consists of a box about 4 feet long, 3 feet wide and 2 feet deep, with tight board sides and two small sash of two lights each, like the ones often used for cellar windows, hinged on top. This is placed just over the pipes to get good bottom heat. Common roofing slates are used for the bottom, and may be held in place by slats. The slate is covered with three or four inches of moist sphagnum moss. Such a case could be readily made by any one accustomed to using tools. In it the most fastidious tropical plants take root readily, either directly in the moss or in pots plunged in it. A little air is given under the sash. It is surprising to lift some of these cuttings with a handful of moss and find it filled with roots.

Cuttings of Nepenthes are considered among the most difficult plants to root, but in this case it is done readily. The cutting is stuck through the drainage hole in a small pot from the bottom, and the pot inverted in the moss. The fine black roots, which look something like coarse horse hairs, form from the end of the cutting, inside the pot. When the plant is well rooted, the pot is broken to free the plant, which is then potted off in very coarse material.

Pennsylvania. FRED. W. CARD.

CLEMATIS CULTURE.

FEW CLEMATISES, with all their varied colors and freedom of growth, are seen in cultivation, where thousands should be. The price need not be any drawback now, as within the last few years it has been greatly reduced. A good two-year old plant which used to cost from two to three dollars can now be bought for fifty to seventy-five cents. Trained up the pillars of the veranda, over an outbuilding or any unsightly object, these plants are very decorative, but in the flower garden a bed of the different varieties makes an object which need only to be seen to be admired. Prepare a bed as if for roses, using plenty of such lasting materials as rotten cow manure and turfy loam, as the longer a healthy clematis is planted the more vigorously will it grow and the more abundant will be its flowers, and being gross feeders, clematises require an abundance of food within reach of their roots. In the beds spring-flowering and summer-flowering varieties should be associated, for just as the former are getting past their blooming periods the latter are beginning to flower, and inflorescence is thus kept up during a long season. The only drawback in growing the two kinds together is that they should be pruned at different times. The spring-flowering kinds flower on the old wood; while the summer-flowering varieties produce their flowers on the young growths; therefore while the latter are much benefited by being well pruned back in the spring, the former should be left untouched and pruned back if necessary after flowering. Still if the two kinds are not planted too closely together, the work can be easier done at the proper seasons. Associated with the clematises, nothing looks much prettier than a few plants of gladioluses or lilies which raise their flowers above the foliage of their neighbors, forming a beautiful bed, and if the late-blooming kinds of lilies are used, they help to prolong the flowering season.

Liquid manure is often of great benefit for this class of plants, and as soon as the bed in which they are growing becomes exhausted, the liquid should be applied, as well as a good mulching of rotten manure in the fall.

Some of the best spring-flowering kinds are: Lord Londesboro, deep mauve; Lady Londesboro, silver-gray with pale bars; Gem, deep lavender; Miss Bateman, pure white; Standishii, deep lilac; Victor Lemoin, violet, tinted with blue. Among the best summer-blooming kinds are the good old Jackmanni, from which have been produced some excellent seedlings, but none superior to the parent; also, Viticella rubra grandiflora, brick-red, fine variety; Tunbridgensis, bluish-mauve; lanuginosa vivina, pure white; Star of India, reddish-plum, with red bars; Otto Frœbel, greyish-white; Magnifica, reddish-purple, and Lady Bovill, grayish-blue.

In Lincoln Park, Chicago, Illinois, I observed several very attractive beds planted with dwarf cockscombs and *Centaurea gymnocarpa* in alternate rows. The silvery-white of the centaurea contrasted well with the dark red flowers of the cockscomb. The beds were all oblong, but a circular bed of the same kind of plants would be more attractive. The cockscomb did not grow over seven inches high. MANSFIELD MILTON.

Ohio.

GLADIOLUS PROPAGATION.

"Do gladioluses run out?" we are asked. No, we think not. But, says one: "Mine were formerly nearly all white; now they are mostly dark, and do not produce as large flowers as formerly; why is this?" Simply because the light-colored ones are not so hardy as the dark ones. They do not increase so fast, and have less vitality. But few are reproduced for any great number of years by division; those nearest the European species are very much longer lived than the white or light-colored from Natal. The consequence is, that the species are perpetuated by the division of the more hardy ones, while the light ones die out. The question then presents itself: "How is the supply kept up for the trade?" This is timely and pertinent. It is done by planting the little bulblets that form at the base of the new bulbs, and above the old. These are planted in drills in the field, just as peas are sown, only more thickly—about 200 to a foot of drill. As a rule, they come up quickly, but all depends upon how they have been kept during winter; if dry and warm, their vitality will be greatly impaired, if not entirely lost; but if kept in earth, slightly moist and cool, not much above the freezing point, nearly every one will come up quickly.

To perpetuate any desired variety, the following is the only way, and it is a speedy one. The bulblets should be taken off soon after the bulbs are taken up in autumn, put in sand, and placed in a cool, moist and dark cellar, and planted in the open ground as early in spring as any seeds can be sown. They should be covered about an inch deep with fine soil, and afterwards cared for in the same way as the most common garden vegetable. If the conditions of growth are favorable, bulbs will be formed as large as marbles, a large proportion of which will flower the following season.

It is a marked peculiarity of the gladiolus that the best or more beautiful sorts produce but few bulblets, while most of the varieties will not produce any after they are two or three years old; the largest number is produced from bulbs only one year old, or the second year from the bulblet. If the bulblets are saved from the best varieties and carefully grown, the increase of bulbs will be rapid; and so will the interest that such beautiful forms awaken.

If there is in gardening any pleasure more fascinating than the growing of the gladiolus from seed, we cannot name it. This pleasure comes, in a great measure, from the uncertainty that awaits the operation. In growing a given number of bulbs from seed, one will be sure of getting an equal number of varieties; there will be no two alike; there *may* be some remarkably choice ones; there *will* be some decidedly poor ones; the proportion of either may be large or small—the results alone will determine that. No care in the selection of seed or cross-fertilization seems to make any marked difference. We have grown millions of bulbs from seeds, some saved with the greatest care, others taken at random, and have secured some of our very best sorts from what we supposed the most inferior seeds. The outcome is purely a matter of chance. As a rule, the chances are greatly in favor of the best results from the best care in selection and the best cultivation.

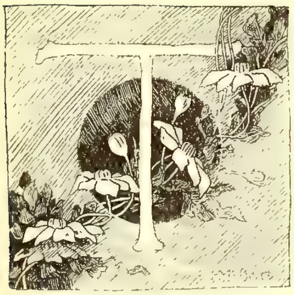
It is a singular fact that in every lot of seedlings, some will be found that closely resemble John Bull, a good white, and Brenchleyensis, one of the best scarlets. Now, these varieties rarely produce seeds; if they did, they would not reproduce themselves; but a close resemblance to these two distinct sorts will always be noticed in a bed of seedlings, while the rule does not hold good with regard to any other named sort.

Seeds should be sown in drills one foot apart, and covered thinly with fine soil; and the bed should be mulched with salt hay or other fine grass, to keep the surface moist and loose until the young plants are well up; then the mulching should be removed and the land be cultivated the same as for bulblets. Many of the bulbs will flower the second year, and their opening will be most interesting.

QUEENS.

AUTOMATIC GREENHOUSES.

A SURPRISING AND IMPORTANT ADVANCE IN GREENHOUSE CONSTRUCTION.



The American Garden always takes pleasure in laying before its readers descriptions of new appliances or inventions of use in horticulture. During the past winter a series of experiments have been conducted by Charles Barnard at his place in Stamford, Conn., in the construction and management of greenhouses. The results of these experiments are here laid before the public for the first time, and they seem to promise an interesting and important change in the entire business of plant culture under glass.

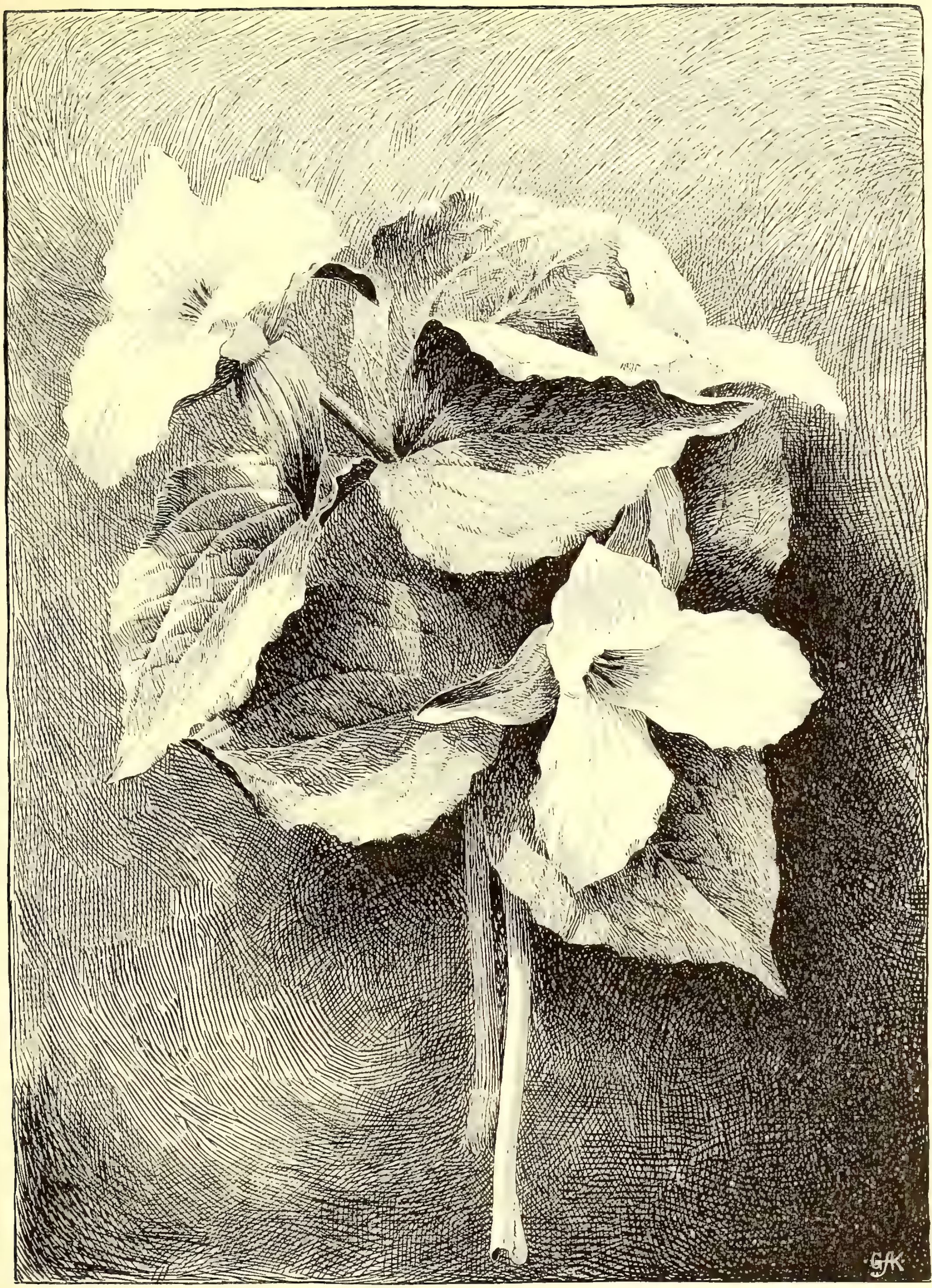
Greenhouses, forcing houses, graperies, propagating houses and other horticultural structures, as now built, are always costly to build and expensive to maintain. Such structures must be built permanently. They cannot be taken down and removed without great loss, and, as a result, are seldom built on leased land. Conservatories attached to houses have to stay with the house, though the family would often be glad to pack it on the furniture van when they move. All such buildings require constant, regular, daily attention. The fires must be looked after night and morning and often in the middle of the night. The ventilators must be opened when the sun shines and closed again at night, or if the sun is obscured by clouds. Hundreds of amateurs have built small greenhouses or conservatories only to abandon them owing to the difficulty of attending to them. The owner is called away on business, and being detained, returns to find the plants burned up by the sun or frozen stiff by the cold. A greenhouse will not run itself and to get a crop of lettuce, Hamburgs or roses; some one must stay near the place day and night for six months without even a half holiday.

The objects sought in the new experiments were exceedingly comprehensive. In the first place, it was sought to make a wall for back and front of a greenhouse that should be absolutely air-tight and, as a result, frost-proof. This has been accomplished by a wholly new method of construction, and it may be interesting to note that when the new house was built at Stamford, and before any plants were placed in it, an oil stove was started on the floor of the house. After burning ten hours the house was not only up to 70 degrees Fahr. inside, but on taking a lamp into the house it would not burn. The oil stove had used up all the oxygen in the air. In a few hours more the stove itself went out for want of air, thus showing that the greenhouse was practically air-tight. In constructing the house attention was paid to convenience in erecting the building and the walls were made in sections, fastened together with screws. The entire building, glass and all, was built under cover, and then by the help of one man it was taken out of doors and set up, in order for immediate use, within two hours. Such a greenhouse can be readily taken down in the spring, stored in a barn and set up again in the fall, or it may be packed on a wagon and carted off with the rest of the furniture. It is thus possible to place a greenhouse on hired land. Such a house is also very much cheaper than an ordinary house.

The next object sought was to get rid of coal and to save all the trouble of an uncertain, irregular source of heat. A coal fire is never for ten minutes the same. It is at first growing hotter and hotter and then steadily grows cooler till it goes out. A high wind makes a coal fire burn fast. A heavy fog and cloudy sky makes it burn slow. An oil lamp burns with an absolutely unchanging flame as long as the wick is fed with oil. It is the same with gas. Oil and gas are therefore the best fuels for a greenhouse, where the plants should be kept in one uniform temperature from hour to hour and from week to week. Many attempts have been made to burn oil in small conservatories, and almost always with complete failure. The heat is too local. It does not readily distribute itself through the building and the products of combustion are fatal to plant life. In all greenhouses using coal the boiler is always in a separate building, at a serious loss of heat. All the heat of direct radiation from the fire is lost and only the heat from the pipes is available in the house.

In Mr. Barnard's plant-house, oil or gas is burned directly in the greenhouse under a hot-water boiler and the boiler itself gives out a great deal of the heat used to warm the building, while hot-water pipes distribute the heat to other parts. At the same time, all the products of combustion are completely taken out of the building and the plants flourish in as pure an atmosphere as can be found in any greenhouse. The loss of space is very small, as the boiler is placed under the table and only about six square inches of table space is lost. The economy of heat is, therefore, very great, and as the greenhouse is practically air-tight, a single seven-foot gas burner will keep the building warm in any winter weather. It is the same with oil. A single wick of an Adams & Westlake oil stove will keep the house warm in moderate weather, and two wicks in any weather. Such results, it is believed, have never been obtained before. The house is a lean-to eighteen feet long, covered with six-foot hot-bed sash, and stands in an open field on a bleak hill-top; and yet it has been operated by oil or gas through the greater part of the past season.

Naturally enough, in such a tight and warm house the question of ventilation became of the utmost importance. The sash were all screwed down tight, and then in the upper part of one sash, near the centre, a wholly new kind of ventilator was put in. The object was to remove all the hot air from the house and to keep out all back drafts or cold air that might blow in at the ventilator. This has been accomplished in a wholly new way, and in a manner that seems destined to completely change our present methods of running greenhouses. The ventilator is fitted with valves, and by means of a thermostat the ventilator is made automatic. When the heat of the sun raises the temperature to 80 degrees (or to any other degree decided upon) the ventilator opens automatically and permits the hot air to escape. Very soon the house cools down and drops below 80 degrees, when the ventilator closes automatically and remains closed until the temperature rises to 80 degrees, when it re-opens. A cloud passes over the sun and the ventilator closes. If the day is cloudy it remains closed, but if the sun comes out, it opens and remains open till the sun



THE "WOOD LILY;" TRILLIUM GRANDIFLORUM

sets or is obscured by clouds. The entire apparatus is under complete control, and may be set for any temperature, according to the crop carried by the house. The apparatus, at Stamford, worked this last winter for many weeks without attention, and the greenhouse was, as far as ventilation is concerned, perfectly automatic. It practically ran itself and was left for weeks without the slightest attention. It, therefore, dispensed entirely with the labor required to attend to the ventilating.

In like manner, the oil or gas burner can be controlled completely by the sun. A thermostat suspended to the roof close to the glass turns down the flame when the sun warms the house in the morning, and turns it up again at night, or whenever clouds obscure the sun. The new house is thus entirely automatic, self-heating and self-ventilating, and the only attention needed is to see that the oil tank is filled about twice a week and that the plants are watered. In the case of gas, no attention is required from the time the gas is lighted in October till it is put out in April.

Mr. Barnard is assisted in his experiments by George A. Weber, a mechanical engineer living at Stamford, and the results of their labors are certainly of the greatest interest to the horticultural world. The details of these important inventions are now being completed, and applications have already been made for patents covering all the improvements.

Naturally enough, in making these researches many new facts in regard to greenhouse construction and management have been discovered. For instance, it has been found that it is not necessary to admit fresh air to such a house; take out the hot and bad air, and fresh air will leak in fast enough through the cracks and through the soil inside the house. Another point: plants in such an atmosphere are remarkably thrifty, and grow with great vigor. The temperature being very uniform, day and night, the plants also grow very fast. The green-fly is easily managed, as the air is so still that a few bunches of tobacco stems laid on the hot-water pipes keep the flies in check.

Messrs. Barnard and Weber will probably make arrangements for the manufacture of these automatic houses under their patents, and according to designs that will be the outcome of their experiments. The present house is, of course, small; but there seems to be no reason why the same ideas may not be applied to any house heated by steam or hot water, and employing gas or oil instead of coal. The subject certainly suggests many interesting possibilities in the construction and management of all kinds of horticultural buildings.

SOME NATIVE ORCHIDS.

OF THE forty seven species and varieties of orchids said to have been found in New England, not all are showy. A few have flowers which have no special attraction so far as color is concerned. The botanist would be interested in such, but the ordinary cultivator who grows them for their display of color in flowers and foliage would not prize them. But some of them are very beautiful. The genus cypripedium (Lady's-Slipper) is one of the most interesting, and New England has five charming species.

The largest and most showy of these is the *C. spectabile*. Not only is it the finest of the five, but it is the most beautiful of the genus. The plant is not uncommon in bogs from Maine to Wisconsin, in Canada, and south along the Alleghanies. In the east it is seldom seen, except in swamps where the arbor vitæ and tamarack abound, but in Wisconsin it is sometimes found on higher ground. In New England and also in Michigan it is frequently found among the poison sumac (*Rhus venenata*) and on this account it is more difficult to obtain. It is not a difficult plant to grow when plenty of peat or leaf-mould is placed about its roots. A gravelly or loamy soil is not so good as clay next to the roots, but with peat it may be grown in any well-drained, moist soil, in the shade. In wet bogs it is frequently found in the open sunlight, but such plants are not so large as where it is shaded, at least a part of the time. The flowers are an inch or more wide. The lip, which, by the way, is the largest part of the flower of a Lady's Slipper, is a crimped, inflated sac, somewhat egg-shaped, pink, purple and white in color. There are frequently several stalks from one plant and sometimes three, rarely more flowers on a stalk.

The Stemless Lady's Slipper (*C. acaule*) is perhaps the most abundant and the hardest to transplant, yet in well-drained loamy soil and in the shade it is not difficult to grow. The flower, which is single, is variable in color from a deep rose purple to almost pure white. Its habitat is generally in dry, loamy soil under pines, though frequently found in sphagnum swamps.

We have two yellow Lady's Slippers, the larger *C. pubescens* and the smaller *C. parviflorum.* The former is found in moist loamy soil along low mountain brooks or swamps. The flowers are pale yellow and nearly two inches long. It is one of the easiest wild flowers to transplant and seems to thrive in almost any soil. It may be transplanted in spring, in autumn, or even when in flower. The small yellow species, *C. parviflorum*, is a more local plant, growing mostly in bogs among arbor vitæ and tamarack. It is smaller, has fragrant flowers, and its sepals and petals are of a darker purplish tint than in *C. pubescens.* The lip is pale yellow and much smaller in the true type than in pubescens. In some localities the plant is very dwarf, growing in little clumps scarcely eight inches high, with dainty little flowers scarcely a quarter as large as an average sized pubescens, while in other localities it grows two feet high. In the taller plants there is more variation in the size of its flowers. Some are quite small, while others are nearly as large as those in pubescens. This plant also likes peat or leaf-mould about its roots, but in any moist loamy soil it will thrive. If the soil is quite moist it may be set in the open sunlight.

The rarest of the tribe is the little Ram's-Head (*C. arietinum*). This also occurs in northern New England and occasionally, thence westward as far as Wisconsin. It is abundant in numerous swamps in Canada, but we believe it has not been reported in New England south of Vermont. Though not so showy as some, the small pink, purple and white veined lip is quite interesting. When transplanted into moist loamy soil in the shade it will thrive and even increase in size and in the number of its flowering stalks. A mixture of peat is very beneficial.

Southwick, Mass. F. H. HORSFORD.

A RACE OF FLOWERLESS PLANTS—III.

YEAST AND BACTERIA—PUTREFACTION AND FERMENTATION—PEAR BLIGHT.

IN THE first article of this series mention was made of some fungi which do not have mycelium, one of them being the yeast-plant. This plant (Fig. A 6) consists typically of a single oval cell of such size that three thousand of them placed end to end would measure only one inch. The yeast plant propagates itself chiefly by a process called budding. A slight swelling is formed near one bud; it enlarges until it is nearly or quite as large as the original cell, then separates from the parent cell and becomes an independent plant; or it may remain attached and by repetition of the process a chain of several cells may be formed before separation takes place.

Domestic yeast consists essentially of this *yeast plant*, which grows in all yeast bread. In process of growth it forms and gives off large quantities of a certain gas—carbonic acid—which, by its expansive power, forces the particles of dough apart and so causes the bread to "rise." Alcohol is produced at the same time and escapes in baking or soon afterwards. The production of alcoholic fermentation, as in beer and wine, is the special property of yeast, and, with slight exceptions, only yeast can produce it.

The bacteria are closely related to the yeasts. They differ from them in being, as a rule, smaller and more thread-like, and in their mode of reproduction. They multiply, not by budding, but by cutting themselves in two (A 11, 16, etc,) A cross-partition is formed and separation takes place sooner or later. In shape they are rounded or in various degrees elongated, simple or pointed, straight, bent, wavy or spiral, and sometimes extremely long and slender. Fig. A (after Cohn) is a general collection of various kinds of bacteria, illustrating most of the typical shapes (all highly magnified), but very many species are known which are not shown here. The different kinds are as distinct as the different kinds of grasses, or pines.

While yeasts produce fermentation, bacteria causes putrefaction, as in spoiled beef; but putrefaction is only a special kind of fermentation. There are few species of yeast, but many of bacteria, and as a rule each of the latter produces its own special kind of fermentation or change in the thing it grows in. Putrefactive fermentation proper we observe in the spoiling of beef (Fig. A 8), acetous fermentation in the formation of vinegar, butyric fermentation—rancidity—in butter, and so on. Some kinds produce peculiar and distinctive colors; as the form shown in Fig. A 1, which produces a red color, sometimes seen in spots on bread, looking like drops of blood. Some species ferment and decompose dead vegetable matter and make soil of it, so that it becomes available again for crops. Recent experiments show that crops cannot grow in a soil destitute of bacteria.

Again, many species prey upon animals and man, and by causing fermentation or decomposition in the blood or various organs of the body produce fevers and various other diseases. Nearly all epidemics and contagious diseases are known or believed to be caused by bacteria. Small-pox is caused by a bacterium (Fig. A 2.) The same organisms produce the same disease in cows, but in a less violent form. A person inoculated with small-pox from a cow, *i. e.*, vaccinated, has a mild form of the disease, after which he is supposed to be free from contagion.

In Europe one of the most contagious diseases of stock is known as charbon. In France, in 1881, an experiment was made with sheep to find a mode of protection against this disease similar to vaccination for small-pox. The bacteria causing charbon (similar to Fig. A 14), were for this purpose cultivated artificially in chicken broth, a few of them being transferred to fresh broth every few hours, where rapid multiplication took place in each interval, till they had thus passed through many, say thirty generations. By this method a cultivated variety was obtained which was less virulent than the wild bacteria, if we may call them so. Then a flock of fifty sheep was taken, and of these twenty-five selected at random, inoculated with the cultivated germs, marked and turned out with the rest. Ten days later, the entire fifty were inoculated with germs fresh from a diseased animal. At the end of forty-eight hours the twenty-five previously inoculated were alive and well, while the twenty-five not previous inoculated were dead.

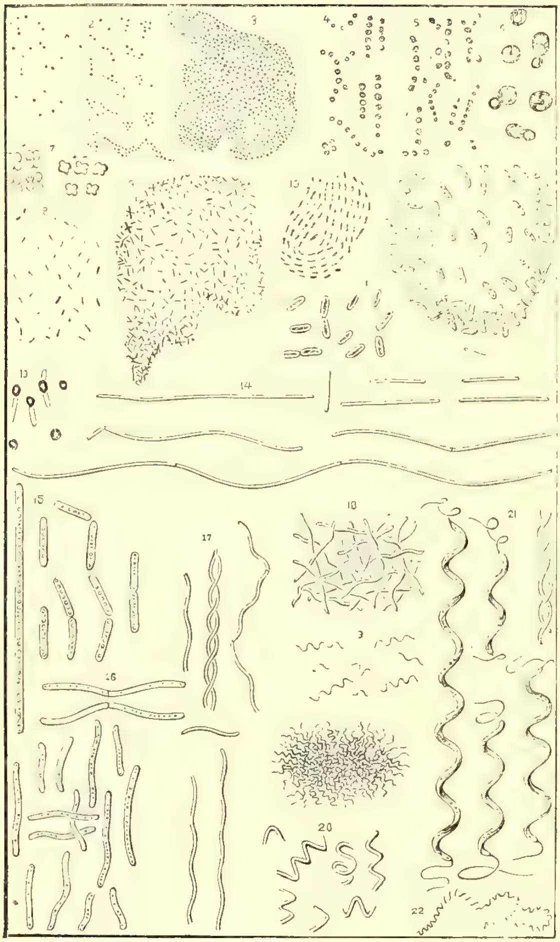


FIG. A.

The following illustrates the vitality of bacteria. A widow living adjacent to the estate of a great land owner in Germany cut clover upon his land to feed her cow and goat. They became sick, and on investigation it was found that at the spot where the clover was cut a steer, dead from charbon, had been buried the year before, and that the germs of the disease had been brought up by earth worms. Cases are recorded where bacteria have been kept sealed up for years without losing their vitality. They will often survive hard freezing and considerable boiling.

The discovery of bacterial diseases in plants is quite recent and was made by Professor T. J. Burrill, of the University of Illinois. In searching for the then unknown cause of pear blight, he observed, first in 1877, what appeared to be bacteria in the diseased trees and their viscid exudations. In 1880 he began to inoculate healthy trees by inserting small pieces of diseased bark or some of the exudation by means of the point of a knife blade or a needle. The blight developed in the inoculated branches, and repeated experiments and tests established the fact that the cause of blight is bacteria. The name fire-blight expresses the prevailing idea that its development is rapid, but this is not the case. Blight results from inoculations usually in eight to twelve days, but sometimes not so quickly, and its progress is slow.

Apple trees were successfully inoculated with virus from the pear, and the reverse, and the quince blight was similarly proved to be the same. The disease followed the inoculation in a majority of cases. In more recent years these experiments have been repeated by others, especially by J. C. Arthur, with confirmatory results.

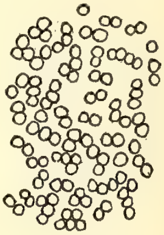


FIG. D.

Pear blight bacteria, when magnified one thousand times, appear as in Fig. D (after Burrill). They usually consist of two joints, but sometimes of one only. Twenty-five thousand could lie side by side in an inch. Their effect on the tree is merely to produce fermentation. Cells of a certain layer in the bark are stored full of small starch grains which the tree has laid away in this customary place to use as food in adjacent parts when needed. The bacteria cause this starch to ferment or putrefy in much the same way that starch will "spoil" when left standing, and with a corresponding bad odor; but the fermentation is of a special kind, its products being carbonic acid and butyric acid. Fig. B (after Burrill) showed a thin section of bark, highly magnified, from a healthy branch. The cells are filled full of small egg-shaped grains of starch. Fig. C (after Burrill) shows a similar section from a diseased branch. The bacteria have destroyed all the starch grains. And this destruction goes on just as fast as the disease progresses and no faster; cells may be seen near together quite full of starch and also in all the degrees of emptiness.

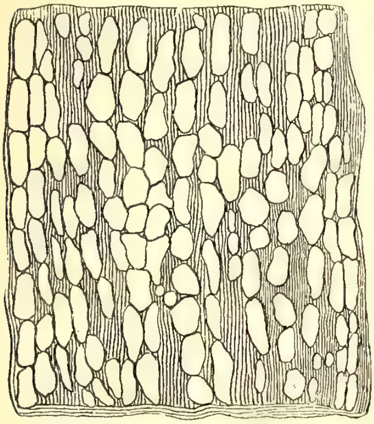


Fig. B.

With the food supply destroyed, the diseased branch gradually dies of starvation and becomes discolored, as do the leaves. The change in appearance does not take place immediately or is very slight at first, so that it is difficult to tell from external appearance how far the disease has progressed. The cell walls are not injured and the disease does not penetrate into the wood. No opening can be seen in the cell walls, even with the most powerful microscope, and it is not known how the bacteria pass from one cell to another. Neither is it known how the germs first enter the tree, but there is reason to believe that they frequently enter through the blossoms at fruits where there is little or no protecting epidermis.

Soil or culture which would produce hardy growth may prevent blight to some extent, but will also reduce the crop. The only practicable remedy is to cut off infected branches and destroy them. It will not do to leave them lying about, as the bacteria can outlive the winter and afterward propagate the disease. The branch must be cut below the lowest diseased tissues, and care must be taken not to spread the contagion by cutting into a diseased part and then into a healthy part. If there is any doubt about the safety of your knife, disinfect it, as often as necessary, by passing it through a flame.

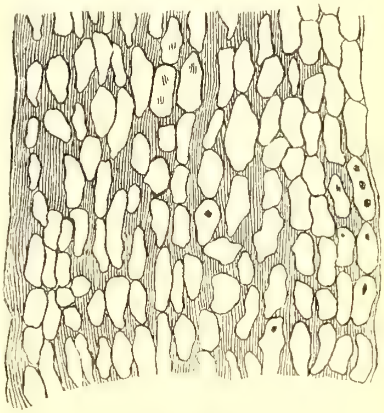


Fig. C

Harvard University. A. B. Seymour.

A NEGLECTED FRUIT.

WORTHY OF TRIAL IN THE CENTRAL AND SOUTHERN STATES.

The edible-fruited mountain ash, *Sorbus domestica*, is a beautiful tree, and in France is much admired, says *Le Jardin*, from which we translate. For our central and southern states it would seem equally desirable. It has odd pinnate leaves, white flowers in clusters and small pear-shaped fruits or berries. The latter are yellow, flushed with red, and though they are less brilliant than those of the common mountain ash, yet in September and October, when the graceful pyramidal tree is covered with them, they present a very ornamental appearance.

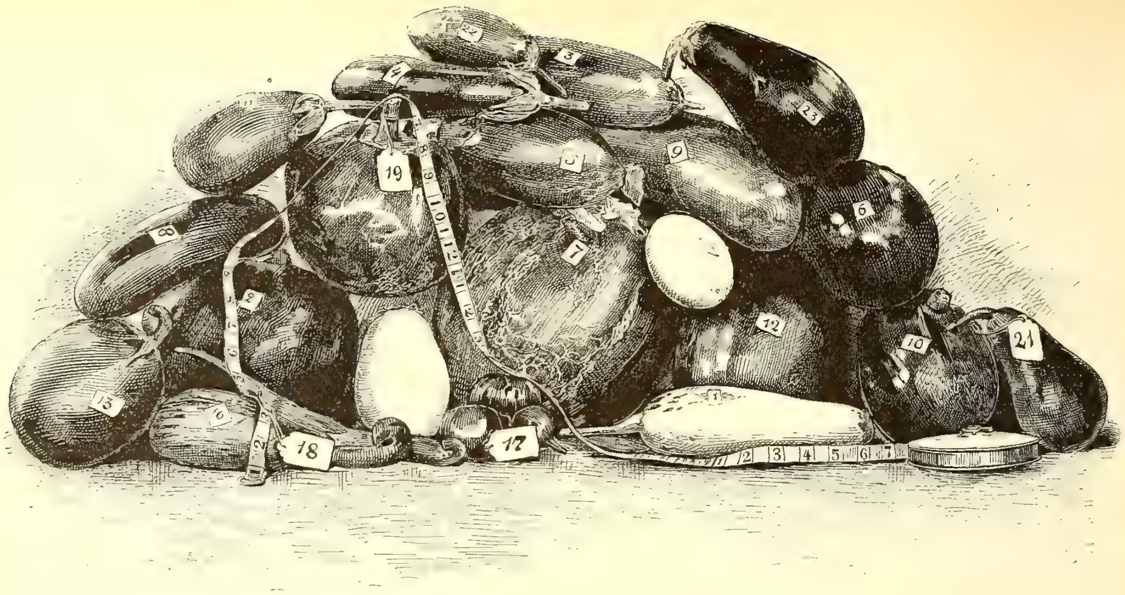
The fruit is much appreciated in the south of France, where it commands a high price. It is found in the shops of Bordeaux and Toulouse from October to January, both ripe and unripe. It is most commonly eaten in the ripe condition, but certain varieties are excellent when they are just beginning to ripen and retain a certain degree of firmness of flesh and brilliancy of tint. Six or eight varieties of different sizes are known. Among the best are those known as the Large Gray, the Large Pink and the Large Red. A variety of especial excellence is represented by a venerable tree on the estates of Madame Dufresne, near Bordeaux. The fruits are large, pear-shaped, yellow, marked with crimson, and of delicious flavor when just ripening.

Another excellent variety with very large ovoid fruits, pale yellow flushed with rose color, was discovered on the property of M. Lafitte, near Agen.

The *Cormier* may be grafted on wild stocks of the same species, on the hawthorn, the common mountain ash, and probably on the apple and pear. It is of rather slow development, producing no considerable crop until after six or seven years from the graft. The tree is easy of cultivation.

The wood is pink, fine-grained, hard and susceptible of a high polish. It is much in demand for carpenters' tools and engravers' blocks, and commands a higher price than the best oak. The bark, when added to wine, promotes the acetous fermentation and rapidly produces excellent vinegar.

From the fruit a beverage similar to honey is made. The slow growth of the *Cormier* seems to be its only bad quality, but despite this it deserves much more attention than it has received, both because of its ornamental and its useful properties.



NOTES ON EGG-PLANTS.

April is early enough in all the northern states for the starting of egg-plants. In fact, better results usually come from late than from early starting. I made several ineffectual attempts at egg-plants before I learned this point. Plants started the first or even last of March, in Michigan or New England, are apt to be excelled by those sown the middle of April. At least this has been my experience. If one has the room and the time, early plants can be kept in a thrifty condition by frequent shiftings, and a good crop may result; but under ordinary good treatment it is safer to start the plants only six or eight weeks before they are to be placed in the field.

A second important point in egg-plant culture is delay in setting in the field. The cool nights and raw days of May are injurious to the plants. Although last spring was a forward one, our egg-plants were not planted out until June 12th, and this proved to be early enough. Plants started the middle of April gave results as good or better than those started the middle or last of March. The egg-plant requires a high and constant temperature, and the plants should not be allowed to become checked. I have never had success in growing them in a hot-bed. We sow the seeds in a forcing-house in flats, and handle them into 2-in. or 3-in. pots and then into 4-in. pots.

The soil for egg-plants should be deep and rich, and one which is not greatly affected by dry weather. "Quick" fertilizers — those in which plant food is quickly available — are necessary. Culture should be very frequent, but it possesses no points of peculiarity.

Although varieties are not numerous, they are exceedingly various. Our plantation last year included 23 names, nearly all those offered in America, France and Japan. A number of these proved to be identical. Fig. 1, above, shows a collection of our varieties. There are few illustrations of egg-plants which convey an accurate idea of a model or average plant. Figs. 2 to 5, from photographs taken in our garden last year, represent good types. Of the very large varieties—those of which the fruits attain a diameter of 10 or 12 inches—but one or two mature fruits need be expected on a plant, while from four to eight fruits to the plant is a good crop of the medium and small sorts. Fig. 2 represents a plant of the French *Violette ronde tres grosse*, or Large Round Violet, which is the largest egg plant I know. A single fruit is represented at No. 7 in Fig. 1. Fig. 3 is the French *Violette longue*, or Long Violet. Fig. 4 is the White Chinese, *Blanche longue de Chine*. Fig. 5 is the common Round White, one of the most attractive varieties, but inferior for the table.

For market purposes the Black Pekin and New York Improved are the most popular and probably the most profitable, but for home use I prefer smaller and earlier sorts. My favorite is the Early Dwarf Purple, represented at Nos. 11 and 21 in Fig. 1. These dwarf sorts are early and productive, and the ripe fruits will persist a long time without cracking. One or two of them makes a meal, while the fruits of the large sorts are too large for one or even two meals. It is commonly supposed that the white sorts are not edible, but this is a mistake. The White Chinese is equally as good as any of the colored sorts.

It is to be regretted that the egg-plant is not more generally grown and appreciated. It is one of the best of vegetables and one of the most interesting to grow. This neglect is no doubt due the difficulties of culture and to ignorance as to proper methods of serving the fruit. The important points in culture are discussed above, and subsequent issues of THE AMERICAN GARDEN will contain instructions to the housewife for preparing the fruits for the table.

Cornell University. L. H. BAILEY.

SEEDS AND SEED-GROWING.

Sixth Paper.

THE RADISH—INTERESTING AND VALUABLE POINTS FOR SEED GROWERS AND SEED USERS.

The articles thus far in this series have been, in the main, devoted to principles rather than practice. Principle is the corner-stone upon which practice rests. Unless this is clearly understood, there will be no certainty as to results. There is a right way and a wrong way in doing everything, and midway there is what may be termed chance.

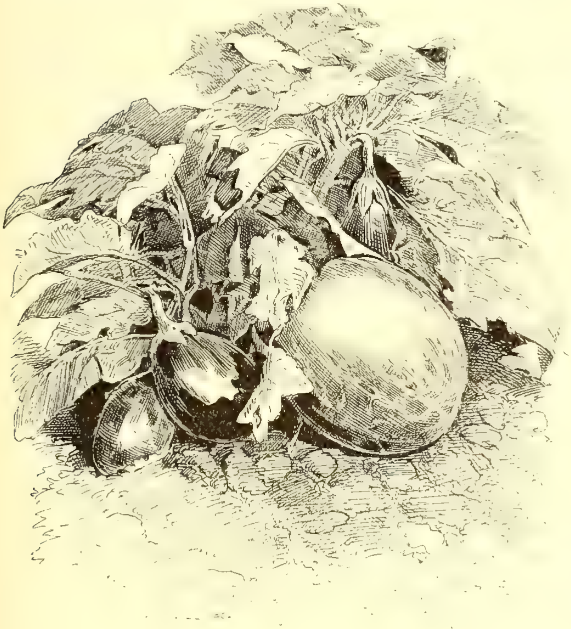


FIG. 2. LARGE ROUND VIOLET EGG-PLANT.

We have endeavored to show the importance of selection in establishing a type, and of its importance in maintaining a type after it is secured. One feature of this principle is to grow all plants for seed purposes where the product attains the greatest degree of perfection. This is the general practice with the seed trade, and where it is neglected unsatisfactory results follow. The principles having been established, we will notice the methods employed in the growing of various crops in order to show how the best of every species and variety is produced.

RADISH *(Raphanus sativus)*.

The radish is supposed to be a native of China, although the species is entirely unknown in its native state. This esculent root has long been held in high esteem. Before the Christian era, its importance was so great that a volume was written in its behalf. The ancient Greeks, in presenting their oblations to Apollo, presented turnips in lead, beets in silver and radishes in vessels of beaten gold. They were introduced into England in the sixteenth century. Gerarde describes four kinds in 1584, such as were commonly grown in English gardens.

Formerly the leaves were often boiled and eaten, after the manner of spinach. Later the young seed leaves were used with cresses and mustard as small salad. But now the roots are chiefly employed, and the young and tender seed-pods are considerably used in making mixed pickles.

General Cultivation.—Radishes, particularly the early sorts, prefer a light soil, made very rich with well-rotted manure, and made fine and light. In such a soil they can be had fit for the table in from four to six weeks. The time will depend upon both temperature and moisture. In midsummer, if the soil is kept moist, a crop can be secured in less than four weeks from the sowing of the seed. The first crop in the garden can be secured by sowing the seed in alternate drills between beets, carrots or other vegetables of slower growth. The radishes will be up and out of the way before the others will need the room. We have had good results from sowing radish seed with the beets and carrots in the same row; the radishes coming up quickly show plainly where the other plants will appear in due time, and will materially assist in keeping down the weeds. When the radishes are all taken out, little other thinning will be required.

Cultivation of the Radish for Seed Purposes.—Radish seed is mostly produced in France, although quantities are produced in England, Germany and Holland. The methods of cultivation are similar in all countries. Our description will be of the French method, and from our own observation. One of the principal sections of the radish-seed industry of France is in the department of Manche, in Normandy, on St. Michael Bay, although great quantities are grown in the south and other sections of France. As a rule, the seed is grown by small farmers, or rather by the owners of small farms, and all the work is done by hand. The plow and the cultivator are strangers to the owners of these small farms, which vary in extent from one to ten acres. The beds for the sowing of the seed are prepared in February ; as early as the weather will permit the seed is sown, usually by the middle of the month. The soil in this section is a light loam, mixed with fine sand, soil that has been reclaimed from the sea since the eleventh century. This is dug deep with the spade. It is by nature close and fine, and when wet is very tenacious and sticky. The seed beds are about four feet in width and as long as are required to furnish the roots for the acreage to be planted. The seed is sown cross-wise in the beds, in rows about six inches apart. As soon as the seed is sown the grower prepares his field for the seed crop. On large farms the plow and harrow are used ; on small farms the spade and the rake are the only tools employed. About the first of June the radishes are ready for transplanting ; they are then the proper size for table use.

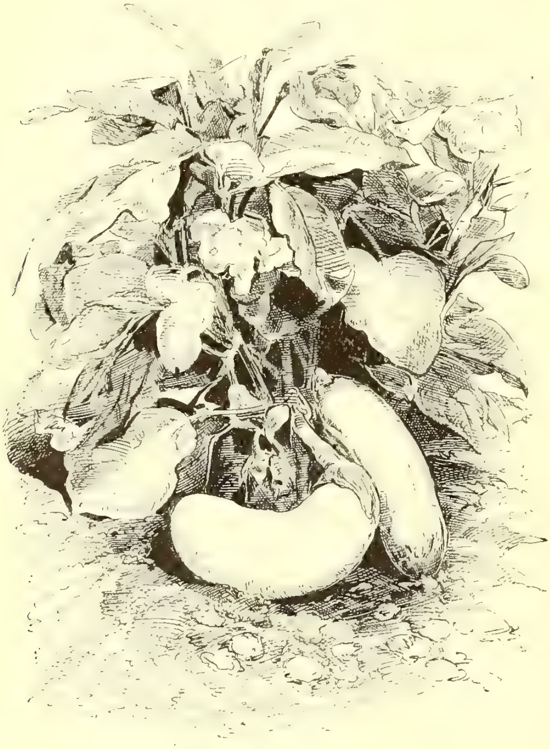


FIG. 4 WHITE CHINESE EGG-PLANT.

Now the important part of seed-growing commences—that of selection. The roots are taken up and selected with the utmost care, even throwing out every root that is not true to the desired type, both as regards form and color. Of course, if the grower is unfaithful to his trust, he will reset every root ; but if any are to be discarded, it will be such as show a tendency to deteriorate, and such invariably produce the most seed. The leading seed houses in Europe have their superintendents always on hand to look after this part of the industry, which is their only guarantee for purity of stock. They also watch carefully for any variation in form or color of the roots, which, like all other plants, are liable to "sport," and the sports are parents of new varieties.

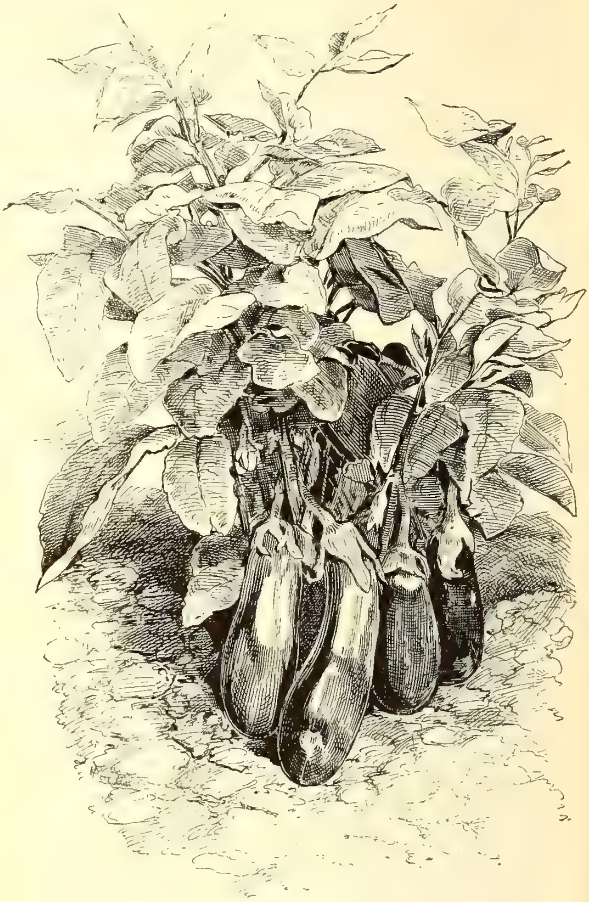


FIG. 3. LONG VIOLET EGG-PLANT.

The foreign seedsmen make the transplanting of the roots a leading argument in the sale of their stocks, intimating that those who sell at less than what are known as standard rates sell from stocks that have not been transplanted, and consequently are not selected. The facts in the case are, that all radish seed is grown from transplanted roots, and that not a grower would think of producing seed by any other method, as it could not be done profitably. The inferiority of seed is due wholly to other causes, mainly from stocks of an inferior character, such as produce the most, rather than the best seed.

In transplanting, the field is marked out in rows three feet apart, and the roots are put two feet apart in the rows. They are planted with a dibble, inserting each root wholly in the ground, down to the leaves, and pressing the soil firmly around them. If all the conditions are favorable—and plenty of moisture is the all important one—the plants will scarcely receive a check and soon make new roots, and shoot up in branchy stalks, which will, by the first of July, completely cover the ground. To ripen the seed perfectly, dry weather is important. In favorable seasons the crop will be ready to harvest in September. At the time of flowering, the roots attain an enormous size. The long varieties are often the size of a large long blood beet, and the turnip-rooted varieties as large as turnips. The stalks grow from three to four feet high in ordinary soil, and in more favored places from four to five feet.

Unless the season is very favorable for ripening the seed and drying the pods, the stalks must be stacked like wheat and remain in that condition until the following season, as it is almost impossible to thresh the seed clean until the pods are perfectly dry; but a more important reason is that if thrashed too soon the seed is liable to heat, unless very thinly spread in a dry room, which the small farmer cannot do, as he has not the facilities. In England, the seed is invariably left in stacks until the following year before threshing. In threshing the flail is still used, and the threshing floor is the hard ground in front of the dwelling, except with the very few of the large farmers who have sufficient barn room for the purpose, and even then, in most instances, the floor is earth, firmly packed down.

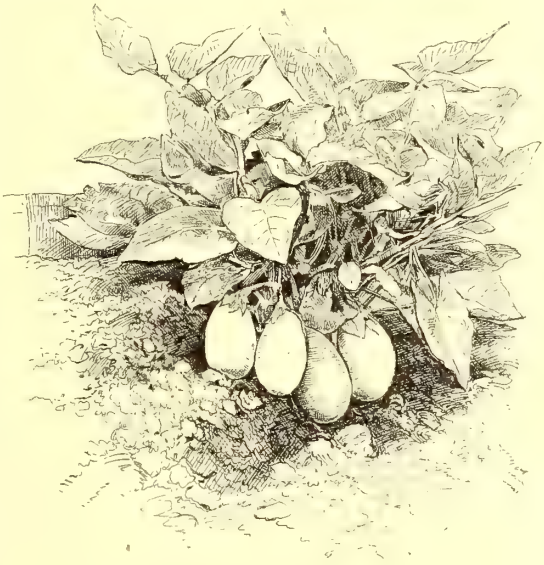


Fig. 5. Round White Egg-Plant.

The seed is cleaned by the use of hand sieves of various sizes, which is a very slow process, as the larger pieces of pod must be picked out by hand, while the finer are carried off by the wind. There is also considerable gravel taken up with the seed, which must be taken out by hand. Mills for cleaning the seed are to be found at the warehouses of all the foreign dealers who have their seeds grown in France, but the growers are too suspicious to permit their use.

To obtain seed of the winter sorts, the seed is sown in the spring, but in drills much farther apart, and the plants given more room in the drill. They may be transplanted in the fall, but the more common and better practice is to take them up in the fall and put in trenches, covering slightly with straw, over which a little dirt is thrown to keep it in place. The roots are then put out in March and the crop of seed is ready to harvest the next September, for selling in the trade the following winter.

Long Island. C. L. Allen.

[to be continued.]

SOME TREES AND SHRUBS.

Hamamelis Virginica.—The "Witch Hazel" is one of the most interesting plants in our woods. It is not of large or imposing dimensions, but in exceptional cases it attains a height of 20 feet, though being profuse in the production of branches, it is seldom seen more than 15 feet high. The peculiar season at which it blooms, together with the fact that it bears flowers and fruit at the same time, is its chief source of popular interest. Of some importance to the medical faculty is the medicinal oil obtainable from its seeds. The flowers usually appear in the winter, though sometimes in fall and early spring. The sepals are insignificant, but the long narrow petals are curious and showy. Numerous clusters of the greenish-yellow fruit may be observed side by side with the flowers. In mere outward form the fruit resembles an acorn flattened at the apex.

What I suppose to be an abnormal development of it came under my notice last season. The deformed fruit was green and covered with soft spines, otherwise it closely resembled the husk or covering of beech nuts in a green state, except that while the beech husk is more or less pointed at the apex, the other was rounded. At the base of each deformed fruit a small aperture was noticeable. On cutting one through, the center was found to be hollow. The interior surface was perfectly smooth and the cavity was well filled with winged insects of a dirty black color. The small aperture penetrated to the interior and may be regarded as a provision for the escape of the insects. On being liberated in a warm atmosphere, the latter showed signs of life by crawling about in various directions, and under the influence of genial sunshine some of the more robust flew away; in a cold atmosphere they showed no signs of animation. There was not a single normal fruit upon this particular plant. In all stages of development, the fruits, which were numerous, bore the same marks of deformity. All other plants that have come under my notice in the same locality have borne only normal fruit, but they are growing in positions where they obtain the full advantage of air and sunlight, while the specimen bearing abnormal fruit is closely shaded on all sides by over-hanging trees.

Euonymous Europæus in October is a showy shrub, sometimes attaining the dimensions of a small tree. It is a native of Europe, but is none the less desirable for every American garden where good things find a home. The Spindle Tree, as it is sometimes called, frequently grows to the height of 30 feet. It is deciduous, but perfectly hardy. Being of a bushy habit, it soon forms a neat specimen for the lawn. The dark green, shining leaves have a very pleasing appearance. The flowers are inconspicuous, but the bright crimson fruits with which the branches are well clad in October render it an attractive object. Early in the month the fruits expand and expose the bright orange-coated seeds to view. Fruits, seeds and leaves form a very pleasing combination of color.

Lonicera sempervirens.—The Scarlet Trumpet honeysuckle is a very desirable plant, as it exhibits some pleasing feature from early spring till late in the fall. It may be called a vine or a trailing shrub, according to the position in which it is planted. Trained against a wall, fence or similar structure, it makes a good climber, but when planted in the open ground without support, it rambles irregularly over the surface. The former situation is the more desirable. It blooms freely throughout the season, and the flowers, bright scarlet on the outside and yellow within, are quite pretty and useful for decorative work. It is quite hardy and naturally deciduous, but if planted in the greenhouse or conservatory, where it will escape the rigors of winter, it retains its leaves throughout the year and grows and blooms continuously.

Symphoricarpus racemosus.—The long pendulous branches of this elegant deciduous shrub are well clothed early in the fall with the large and beautiful white berries that give it the appropriate name of Snowberry. It seldom exceeds four feet in height. The drooping habit of the branches gives it a graceful appearance, but the large white berries are its most attractive feature, as their beauty is fully developed during the fall and early winter, when most other hardy shrubs present anything but a pleasing appearance. The berries are retained upon the plant long after the leaves have fallen.

Daphne Cneorum.—This species is both curious and pretty. It has a trailing, though compact, habit, and seldom exceeds six inches in height. When in bloom, the numerous bright pink flowers are very attractive and fragrant. Being perfectly hardy, it is a very desirable little gem.

B.

Harvard Botanic Gardens.

WHOLESALE MARKET FOR THE SALE OF CUT-FLOWERS.

NOTES OF AN ENGLISH EXPERIENCE.

A question was asked at one of the florists' conventions as to the advisability of having a wholesale market for the sale of cut-flowers in our large cities. It was replied that it would depend largely upon the local needs. The markets of London and Paris were mentioned as the only successful ones. I could mention several more. I will instance one, that at Evesham, Worcestershire, England, which has been very successful. Flowers, fruits and vegetables are brought there in cart and wagon loads, and are eagerly bought by the agents of commission and wholesale dealers, and are then forwarded to all the large cities and towns throughout England and Scotland.

I was born and brought up near the town of Evesham, which is the center of a very large area of country, principally cultivated in small fruits and flowers. Many hundreds of acres are rented in small lots, from half an acre up to ten acres each, for which a rent from $35 to $75 per acre (not including house, etc.) is paid. The soil is a very deep, rich black loam, which has been cultivated as garden land for several hundred years. Double cropping is practiced a great deal. Frequently one may see three or four sorts of vegetables and flowers on the same piece of ground, maturing in succession.

Some ten years ago, nearly all the produce of this locality was sent by railway to certain salesmen who lived in the large cities and towns. These salesmen sold everything to the storekeepers for what they could get. Sometimes good prices were realized, at others not enough to pay freightage. Other growers took their produce 30 or 40 miles; others more, in carts or wagons, and sold it to the storekeepers themselves, thus saving the commission and other expenses.

Some seven years ago a great change took place. A few growers collected and discussed the matter, and it was decided to induce an auctioneer to build a suitable building where anyone who choose could send anything they grew. Three days each week, and at a certain hour, he commenced to sell, and of course the highest bidder was the purchaser. This building is near the freight station; wholesale dealers and commission men in the different cities and towns appointed resident agents to attend the sales and buy up anything suitable for their particular markets.

At the present time, several auctioneers make a special business, every day, of selling garden produce in all the garden centers in Worcestershire. I know one grower who rents several hundred acres of land in that locality, who planted one year five acres of wallflowers to be retailed in his store in Manchester, more than one hundred miles from the farm. Very few send their produce to the commission agent now, as they can load up and send it to the sale shed, have it sold and receive their money in a few hours. There is no loss of time, no credit, no anxiety, no risk of transit. The purchaser repacks, loads on freight train, and forwards to destination. Three years ago when I left England the auction worked well, and both the seller and the buyer felt satisfied in every way. I may say that the flowers were mostly sent loose in baskets, each variety by itself; some few were made up, but not many.

I cannot see why some such plan would not work well in America. Could not an auctioneer be induced to hold a sale once or twice a week in the large towns? Such a practice would stimulate trade. A better class of stuff would be produced, the grower have a certain outlet for his produce and the dealer would make a better profit.

Minnesota. G. M. STRATTON.

GARDENING IN SOUTHERN FLORIDA.

SOUTHERN Florida is preëminently the land for successful and profitable gardening on the intensive plan, from the fact that every square foot of the land devoted to this industry can be kept profitably occupied by growing plants throughout every month of the year. There need be no vacant spaces in the garden, and land and fertilizer can be utilized to the fullest extent. October is the month in which to commence regular gardening operations here.

The primary requisites for the highest and most complete success in Florida, are a tract of fertile soil, well drained, either naturally or artificially; a good fence around it that will exclude both tame and wild animals (I prefer woven wire fencing with inch and one-half or two-inch mesh); a force-pump, tank, hose and other appliances for supplying and distributing water from a well, lake or pond whenever the heavens fail to furnish the requisite amount of moisture; and readily adjustable protective covering to shield the more tender plants from the occasional frosts of winter or the scorching rays of the summer sun.

The land should be abundantly supplied with a large amount of thoroughly decomposed vegetable matter to retain moisture and fertilizer for the use of the plant. The old settlers who have cattle supply the requisite amount of manure by cow-penning the land for a few weeks before the time of planting, by which means they secure the benefit of the liquid as well as the solid excretions, and pack the land firmly by the trampling of the cattle, a course decidedly beneficial to the loose Florida soils. Those who do not have cattle depend upon the use of chemical fertilizers. Cotton-seed meal is most largely used, but usually in conjunction with bone meal and potash, or cotton seed hull ashes, or hard wood ashes—ashes being regarded as especially valuable. The incorporation of a large portion of the fertilizers with the soil several weeks before planting the seed or transplanting the plants from the beds where they were started is considered the better plan.

A piece of hammock, or a tract of comparatively moist land on the margin of a lake, or a well-drained "bay-head," is usually preferred for a garden, though many excellent gardens are lately being made with good results near, residences on the high prime and black jack lands. With these, however, ready facilities for copious and frequent watering are indispensable, as there is so little vegetable matter in these soils that the water does not spread from side to side in the ground, but takes a direct downward course.

On these higher and less retentive soils, muck dug the year previous and exposed to the atmosphere, or composted with shell lime or potash, is used with excellent results, not because of its especial manurial value, but because its use makes the soil more retentive of moisture.

The most wide-awake cultivators give their ground several deep plowings, with as many harrowings, applying a large portion of their fertilizer during the progress of the work, the aim being to make a deep, rich, mellow soil, and afterward rake a good supply into the earth. After planting, the ground is compacted with a heavy roller. In fact, the manner of preparing the land, fertilizing and planting it, is about the same in Florida as in other states, except that there being a woeful lack of barnyard manure, the chief dependence has to be on chemical fertilizers, even for the hammock as well as the pine lands. The indications are, however, that cattle raising will soon become more general.

South Florida has four distinct seasons—occasional rains in the late autumn and winter months, usually sufficient for the needs of growing plants; a dry spell of a few weeks during the spring months; the wet hot season with showers, usually early in the afternoon, almost continuously during the calendar summer months; hot dry weather in September and the first part of October. The exact time of beginning and length of each of these seasons, however, varies from season to season and year to year. Besides, there is a cycle of change covering some seven or eight years that modifies these lesser cycles of the year. During this term of years the seasons gradually change from extremely wet to extremely dry years and as gradually to wet again, when the swamps and ponds again fill with water, and so on in a ceaseless round. This fact seems to be well established, and corresponds thus far with my nearly seven years' experience in Florida. Again, the annual wet season may begin in May or may be deferred until the last of June. The almost daily showers may be continued well into October. These showers, however, are generally of short duration, usually lasting but a few minutes, rarely an hour. The dry spells in spring and fall also vary several weeks, as regards time of commencement and duration. The heavy dews, however, prevent scorching and devastating drouths, and some of the crops are sure to thrive. Hence, a varied production is emphasized, as well as different times of planting if one expects to attain profitable and satfactory results from their efforts.

Orange Co., Florida. SHERMAN ADAMS.

THE CONSTRUCTION OF A LOW COST PIAZZA CONSERVATORY.

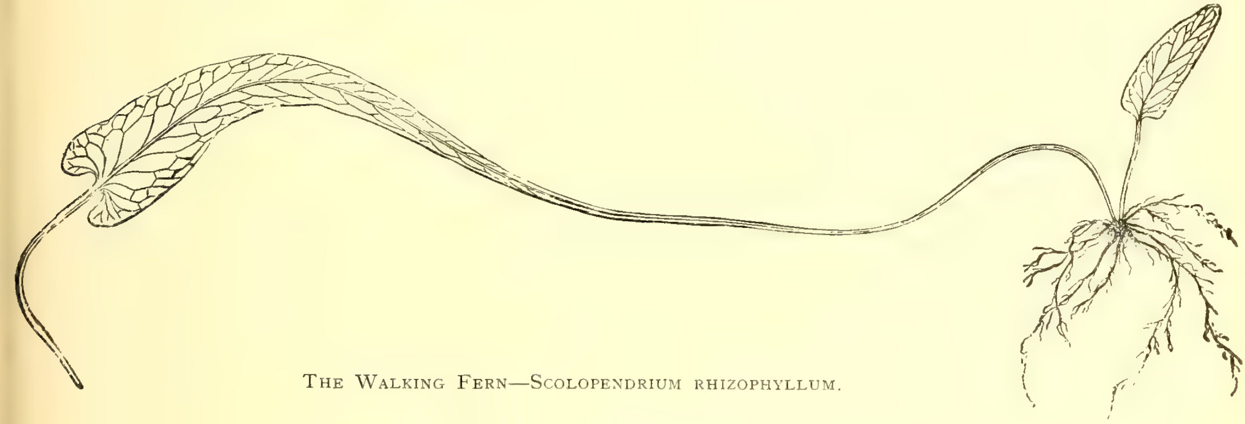
TO MEET the popular demand for a well built, low cost, and convenient conservatory is a difficult matter. The writer's ambition to possess such a structure, say sixteen feet long and eight wide, built against the house, was almost entirely destroyed when a greenhouse construction company estimated the cost at $300, exclusive of foundations and heating apparatus! However, a reliable carpenter was found who would build a piazza extension at $4.50 per running foot, eight feet wide, exclusive of the shingle roof, but with rafters two by four inches, fifteen inches apart. This was with pillars, rails, etc., in keeping with an original piazza, and with a two-inch Georgia pine floor to better resist the results of continual dampness. The under side of the floor joists was sheathed with builder's paper and rough boards, thus making an air chamber to resist cold, as the piazza is elevated two feet from the ground. Cost of piazza, $72.

By calling on one of the wholesale glass dealers whose advertisement has appeared in THE AMERICAN GARDEN, the cost of the necessary quantity of first-quality, double-thick French glass for the roof was found to be $15. The cost of inserting glass was $7, and the method employed was to bed the glass in best white lead putty (no putty on top), and then by the use of an oil can, a stream of white lead and oil was poured along the line where glass and rafter meet. On this was thickly sprinkled sand, and the result was a cemented edge which should last for years without leakage. The late Peter Henderson often declared that this simple process had saved him thousands of dollars in repairs.

The enclosure of sides and ends was effected by the use of removable sashes, running from floor to rafter plate, say eight feet long and two and a half wide, with glass beginning three feet from floor end, and in panes 2½ x 2 feet. The sashes were tongued and grooved, and were held in place by buttons at the top and strips of wood at the bottom. Cost of sash, $3.50 each, or $35. Cost of door, with glass in upper portion, $3.50. Benches, water connection and incidentals, brought the total cost to $150 for a house for which over $300 was asked. Now for the heating. A $37 self-feeding hot-water boiler was purchased, capable of heating 100 feet 4-inch pipe. Only 90 feet of pipe was necessary; price, 12 cents per foot, or $47.50 for boiler and pipes. Cost of connections, including expansion tank, elbows, branches, etc., was $18. The boiler was placed in the cellar, and connection made with the conservatory through the foundation wall. All the necessary connecting work was easily done without the aid of the plumber. Total cost of the heating arrangement was $65.50, and the house, including painting, was completed for $235.

The pipes are supplied with "unions," and can be taken apart and away at short notice; the benches are on horses, and with the removable sashes can be quickly removed and stored, when the conservatory becomes again in appearance, an ordinary piazza with a glass roof. Thus in summer, by putting an awning over the glass roof, the residence itself is not heated, nor are the breezes denied free entrance on account of the serviceable, practicable conservatory, which on the approach of cold weather, can be made quickly and easily to materalize, and to become a source of occupation, beauty, pleasure and profit during the long winter months.

New Jersey. H.



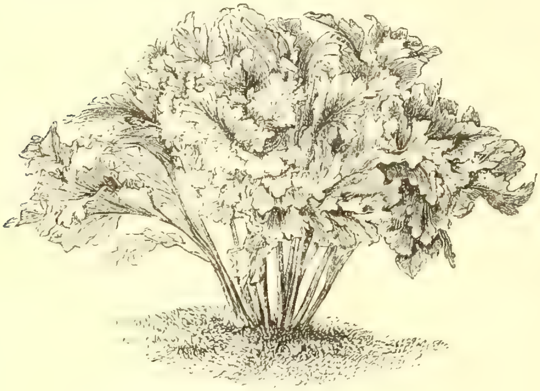
THE WALKING FERN—SCOLOPENDRIUM RHIZOPHYLLUM.

THE SCOLOPENDRIUMS.

Of all the delightful plants found in my youthful rambles among the hills, there was none that roused such a sense of the mysterious and whetted the edge of search to the extent that did the Walking fern. To think that it actually migrated from year to year, was almost too much for youthful credulity. The whole genus is interesting. The common English species, *S. vulgare* or Hart's Tongue fern seems to have the power of endless variation in form, size and texture, and no other fern is so abnormally crested in appearance. In fact, in some of its native habitats no two leaves appear alike. The ends of the leaves in some varieties are doubly crested, giving it the appearance of a green cockscomb; others again are serrated all along the edges of the leaves. In some localities we find it in its normal type, that is, with a plain lance-shaped leaf, usually about a foot long, and (where the conditions are favorable) in great abundance. Its favorite habitat is on the north side of a limestone cliff, where the sun never shines, with sufficient moisture percolating through the crevices of the rocks to keep it constantly moist. There is just such a place as this at Miller's Dale, in Derbyshire, England. In that dale I have seen the face of an inaccessible cliff completely clothed with this fern, many of the leaves measuring over three feet in length, as thick as a piece of leather, and of an intense dark green. (In the shade of this fern there was also growing an abundance of the small trichominæ.) Although this fern prefers the shade, it grows in many places under entirely opposite conditions; an old dry wall is one of its favorite haunts, or on the north side of a bridge, and occasionally along the hedge banks, but when found under these unfavorable conditions the leaves are much smaller, and the plant takes on that peculiar one-sided look sought after by wide-awake botanists.

There are many forms of scolopendrium sufficiently interesting to be grown in a greenhouse collection; among these may be mentioned *S. crispa*, *S. lanceolata*, *S. serrata*, *S. densum* (one of the best), and *S. cristatum.* Some of the foregoing forms have a great resemblance to the Bird's Nest fern (*Asplenium aphis nidus*), which has the appearance of an enormous bird's nest. The abundance of dark scales at the base of each leaf gives the plant a nest-like look.

Another curious and interesting species is the Walking fern, *S. rhizophyllum*, so called from its peculiar migratory habit, the detail of which is indicated in the illustration. This was formerly abundant in the neighborhood of Passaic Falls, New Jersey. The end of each leaf of this species carries with it an embryo plant; when the mature leaf decays, or by accident falls over, the young plant immediately takes root, and in course of time goes through the same process as its parent, and by that means is capable of clothing a large area with their dark green leathery leaves. While not "showy" or of especial beauty, the whole process of reproduction in this fern is extremely interesting to the true nature lover, who will watch its gradual progress with that keen delight which always rewards the searcher into the wonders of plant-growth. When growing these quaint ferns, it should be borne in mind that none of them are of any use to cut for florist's use; they soon wilt, and are not at all handsome for use as single fronds, but a lover of plants will always find a place and use for them, in that part of his planting which is done for the individual interest and charm of the subjects. If he succeeds as well as one collector did, who, wishing to keep intruders off his premises, had a notice posted on his garden path to this effect, "Tramps, beware! scolopendriums and adiantums are planted here!" even the formidable name will have been of some use.



SCOLOPENDRIUM VULGARE CRISTATUM.

There are thus many quaint and often delicately beautiful forms of plant growth which appear only to the botanist, because he only is apt to look beyong the plants of the "catalogue trade."

SAMUEL HENSHAW.

HOW TO MARKET BERRIES.

BY AN OLD MARKET-MAN.

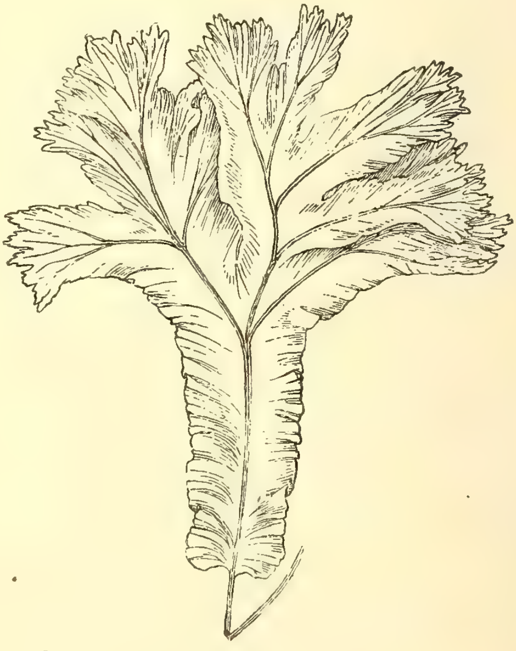
STRAWBERRIES.

As moisture after picking causes all small fruit to decay, you should avoid as much as possible picking while the dew is on or when the plants are wet from rain. By delaying the picking a short time the fruit will dry off, and it will keep and carry better, and consequently bring better prices in the market. This is a point that is very often overlooked in the hurry to get the fruit to market.

Great care should be taken to have the picker pick all the ripe berries at each picking, as any left and picked next time will be over-ripe, and tend to destroy the sound fruit. The juice of one soft berry will ferment and spoil and injure the whole quart, and frequently the whole package. Care should also be taken that there are no unripe or small berries mixed in the packages. The packages should be well filled and rounded, so that they will be full when they reach market—the dealer will bless you for this, and the customer will be happy too. Of course, in doing this you may give more berries to a crate than your neighbor, but it will pay you better.

In finishing off the packages, the top layer should be placed stem down, and the bright side of the berry up. They should be carried to a shady place, and be allowed to stand where the wind can blow over them to cool the berries and to carry off any moisture that may be on them before the packages are placed in the crate. The cover of the crate should be left open until ready to load, to give air as long as possible; keep the crates in a cool and shady place.

If the berries are sandy, as they frequently are after a shower, put them up without washing and do not top off



SCOLOPENDRIUM VULGARE LATO-DIGITATUM

with clean fruit, as that will injure your reputation with the buyer. All the old and experienced fruit-raisers have found that the best way to get the highest price for their fruit is to put it up honestly. Such packing enables the commission dealer to "chalk up" that mark or brand as being sold, and for which he is sure of getting the highest price. But if the fruit is not put up honestly and satisfactorily it has to be sold to peddlers at low prices.

The crate now used in New York markets, and giving the best satisfaction, is the 32-square-quart ventilated crate. In buying crates, see that they are ventilated or have openings between the top of crate and cover. The openings should not be in the cover, as they would let in dust. The heat and sweat, in unventilated crates, rise up against the cover and condense, falling back on the top layer of berries and turning them black. There can be seen daily in the market, after the busy first sales are over, salesmen changing the top layer of baskets to the bottom, and bringing bright fresh ones on top.

The berries should be picked ripe, or of full color, when to be sold within twelve hours after picking. If to be longer on the way, they should be a trifle under-ripe but yet full colored. If to be sent by express, use a crate known as the express crate, costing a little more than half the price of the standard crate, and only half the weight.

RASPBERRIES.

The same care and attention should be used in picking and packing this fruit as in strawberries. For black-caps, use pint baskets, but for the red varieties one-thirds and half pints should be used, as anything larger makes too large a bulk and the fruit is mashed by its own weight. There are long pint cups made and sold by the leading manufacturers which will fit in the 32-quart crate, so that the strawberry crate can be used for shipping black-caps.

BLACKBERRIES.

Blackberries should be picked and packed nearly the same as strawberries. They are shipped in quarts or long pints. Great care should be taken to keep out all bruised, soft, or mashed berries. Packages must be well filled, to allow for shrinking.

HUCKLEBERRIES.

The best package for this fruit is a quart measure, using the 32-square quart crate. See that the packages are tight enough at the corners to prevent the fruit from shaking out. The leading manufacturers make a special quart box for this fruit, being closed at the corners and fitting the 32-quart strawberry crate. The fruit shipped in quarts always brings a higher price, and is of more ready sale than shipped in half bushel tight boxes.

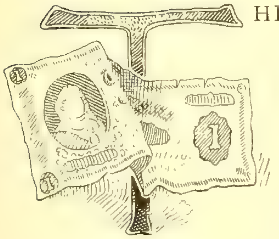
CURRANTS.

Currants should be ripe or nearly so when picked. Keep out all bruised or mashed fruit, as a few mashed berries will ferment and turn the whole package sour in a very short time. They should also be as dry as possible. If picked wet, they should be spread out thinly in a cool dry place before packing. They should also be free from leaves. The best package is the 32-square quart crate. The packages, when well filled, will hold, on an average, 1¼ pounds, and they are sold by weight. Some parties use the ten-pound covered veneer grape basket, but buyers mostly prefer quart packages.

S. B. CONOVER.

LOW PRICES OF FRUIT.

A GROWER'S OPINIONS.



THE question of low prices of fruit discussed by C. W. Idell in the February GARDEN, is most important, though I differ with him on some points. He is undoubtedly right in condemning the practice of shipping poor fruit to the cities; he wisely advises growers to plant less acres, to devote more care to securing fruit of better quality. The grower has tried the plan of growing large, fine-flavored berries, packing in neat, new packages full to the top, putting pretty green leaves on to make the fruit look well, has written the name of the variety on the package and stenciled his own name on the crate as a guarantee of good faith, and all to little avail.

You make a shipment, receive a dispatch telling you your fine fruit has sold well and to "ship heavy to-morrow." You feel encouraged, but when a day or so latter you learn that your fine Sharpless strawberries have sold at the same price as your neighbor's small and soft Crescents, inferior in every respect, you fail to see why if the "taste of the consumer has become so much more cultivated" for fine fruit of good quality, you did not get an advanced price. These are facts from the grower's standpoint. I know that the huckster gets an advanced price and that the consumer pays it, but the point is, does the grower receive the benefit he should? I think not.

When five crates of choice berries from a small grower have to sell fifty crates of inferior ones from a larger grower, I fail to see how the small grower can continue to grow choice berries that do not yield half the quantity of the smaller ones per acre, and for which he receives the same price. To make choice fruit plentiful in the city markets, the grower must receive an advance price for his superior product, and when he does not he will continue to grow the ones that give the most quarts per acre, regardless of size or quality. The commission men are always on the lookout for the man who has the largest berry fields or orchards, and to keep his trade, in western vernacular, they will "stand in with him." In order to do this, they usually manage to sell his inferior product at the same price as they do some one of his neighbor's choice, well-graded stock. That this is a fact, hundreds are ready to prove.

As to the packing of fruit, especially peaches, commission men and buyers have done more to break up honest packing on this peninsula than any one else and have only themselves to blame for it. They positively refused to buy peaches through the exchange last summer, because they claimed that a grower had no right to put a price on his fruit himself and should accept just what the buyer offered. As the result, some growers, seeing their peaches were not dumped, packed in any way so that the big fruit was on top, and the buyer got the benefit of it. When peaches were sold through the exchange a sworn inspector dumped enough baskets to show the buyer that the fruit was honestly packed, and he saw just what he was buying. Now he takes them at haphazard. As a result, Wyoming, so long celebrated for its finely-packed fruit, furnishes as much inferior stock as can be found anywhere. As further evidence that the grower is not fairly dealt with by the commission man, a paper read before the New Jersey Horticultural Society will show. The writer, Mr. W. H. Goldsmith, heartly condemns the practice of selling "different producers' goods in lump lots, and the pilfering allowed in the stores, in consequence of which the value of many fruit packages is reduced one-half."

Your correspondent says "shippers show the utmost indifference to the whole matter." I cannot agree with him. Some growers are indifferent, but as a whole our best fruit-growers always inform the commission man by telegram what he may expect and follow his advice to the letter. Suffice it to say that if the commission man will only return to the grower just what his product sells for, the grower will gladly and promptly unite with him in correcting such abuses as poor varieties and bad packing. C. W.

Sussex Co., Del.

FERTILIZERS FOR THE GARDEN—VI.

"SOIL TESTS"—SOURCE OF PLANT FOOD IN MANURES—BIG CROPS—COST OF CHEMICAL MANURES.

WERE IT not so aggravating it would be amusing to hear some of our experiment station directors and professors and editors and "institute workers" talk about the necessity of "soil tests." Those of us who have waited patiently and labored earnestly for the establishment of experiment stations, now that we have at length got what we wanted, are looking to have some of the doubtful points cleared up by actual experiments. Instead of that, some of the directors coolly tell us to make the experiments ourselves, and that if we need any directions for carrying them out they will cheerfully furnish them. How kind!

These "soil tests" that we hear so much about are merely an excuse for neglecting to make the desired experiments at the stations. The idea seems to be that soils differ so much that it is necessary to make experiments or tests on every farm or in every field or garden. This is essentially a misconception. At any rate, it is no excuse for neglecting to make experiments on different crops with different fertilizers on the different experiment stations.

If a gardener has some good, carefully saved and well-rotted stable manure, he does not need to make "soil tests" to find out whether his land needs it. What he wants to know is what crop will be most benefited by it and bring in the most profit from its use. Furthermore, he would like to know if some particular crop does not need a more liberal supply of this or that ingredient of manure than other crops. If, for instance, soluble phosphoric acid is not specially favorable for the growth of turnips, lettuce, radishes, etc., or if nitrogen, as shown by the experiments of Professors Voorhees and Bailey, is not highly favorable for the growth of tomatoes. We did not know this fact a year ago. And it cannot be doubted that well planned and carefully conducted experiments will furnish much needed information in regard to the wants of many horticultural plants.

At the present time, we do not even know whether carbonaceous matter is, or is not, necessary for success in gardening.

So far as wheat and barley are concerned, the experiments of Lawes and Gilbert demonstrate that carbonaceous matter is not needed. In other words, if we take say 30 tons of stable manure and set fire to it, and were able to retain the nitrogen, the nitrogen and the ashes would produce just as good crops as the 30 tons of manure. This is a rather loose statement, and may be open to criticism, but it is essentially true; we have not time now to allude to the needed qualifications. The general fact that carbonaceous matter is not needed for wheat and barley (and probably for other plants also) is absolutely proved.

Mr. J. M. Smith, of Green Bay, Wis., a pre-eminently successful gardener and fruit-grower, kindly answers some questions in regard to four acres of potatoes he grew last year. "My compost heaps," he writes, "are composed of stable, barnyard and pig-pen manures, with all the refuse of the 40 acres of garden, such as potato tops, pea and bean vines, weeds and, in short, everything that we think will add to their value as fertilizers. The compost heaps are wet down occasionally when they are getting too dry. But we never intend to wet them sufficiently to drain them in the least. They are worked over once or twice during the winter, and in the spring are in the best of order for making a very quick and rapid growth of crops. These compost heaps are my main dependence for large crops and they rarely fail to produce the desired result. The land on which my potatoes were grown had for a number of years been manured each year with about 30 loads of manure per acre, and in addition, about 75 bushels of unleached wood ashes."

No wonder Mr. Smith raises large crops!

The 30 tons of this manure would contain not less than 300 lbs. of nitrogen, 300 lbs. of potash and 180 lbs. of phosphoric acid. We are probably safe in saying that the crops grown do not remove half the plant food furnished in the manure, and consequently the soil must be getting richer every year.

But what do we mean by "richer"? We think it would be difficult to persuade Mr. Smith to stop using, even for a single season, what he justly calls his "main dependence" when he wishes to raise a large early crop of choice vegetables.

Last year he competed for the prize offered by the *American Agriculturist* for the largest crop of potatoes grown on one acre of land, but like the sensible and experienced man that he is, he did not confine himself to one acre. He knows that the season has much to do with the yield. A quantity of manure that would give a great crop in a dry, bright, sunny season might cause the potatoes to run too much to vines in a damp, cloudy season.

The manures used on each acre, together with their approximate composition and the yield per acre, are given below:

	Nitrogen, lbs.	*Potash, lbs.*	*Phosphoric acid, lbs.*	*Yield in bus.*
1—Ten cords or 30 tons of manure	300	300	180	404
2—80 bushels unleached wood-ashes	None	200	50	454
3—1,500 lbs. Stockbridge potato manure . .	52	105	173	454
4—1,500 lbs. Mapes potato manure	60	98	180	426

As there was no unmanured land, we cannot be sure that *any* of the manures used did any good.

Knowing the condition of the land, we cannot think the carbonaceous matter of the barn-yard manure was of any benefit to the crop. The other three fertilizers used contained no carbonaceous matter, and all of them produced a somewhat larger crop than the manure. The potash, very probably did no good. This is indicated by the fact that none of the fertilizers contained as much potash as the manure. Neither was it the phosphoric acid; because the ashes not only contained a much smaller quantity, but it is not as soluble as that in the fertilizers.

At first sight one would be apt to say it could not possibly be the nitrogen that increased the crop, because the ashes, which produced 50 bushels more per acre than ten cords of manure, contained no nitrogen. But this does not follow. We all know that lime has been used as a fertilizer for hundreds if not thousands of years, and it is now generally admitted that its chief effect is due to its action in favoring the formation of nitrates from the stores of nitrogenous organic matter in the soil. The 80 bushels of ashes used would furnish 40 bushels of carbonate of lime. And on such land as Mr. Smith's, that has been manured every year with 30 tons of manure per acre, there must be a large accumulation of nitrogenous organic matter that can only furnish food for plants after it is decomposed and the nitrogen converted into nitrates. The lime of the ashes, as well as the potash, would favor nitrification. In other words, they would furnish nitrates.

We will not suggest to Mr. Smith that he should test this question by trying lime. Practical farmers and market gardeners are too busy to make accurate experiments. We want the experiment stations to do the work for us. And for some years to come, at least, we do not want to be asked to make "soil tests." There is plenty of work to be done at the stations. We do not want more stations, but more carefully planned and accurately conducted experiments at those already established.

Alluding to the admirable experiments of Professor Voorhees on tomatoes, we remarked, in THE AMERICAN GARDEN for March, page 171:

"It may surprise many gardeners that 20 tons of fine barnyard manure did not produce as large a crop of tomatoes as 160 lbs. of nitrate of soda." And it may surprise some of our readers that 80 bushels of unleached wood-ashes should produce a larger crop of potatoes than 30 tons of well rotted manure on Mr. Smith's highly manured land. We have intimated above that the ashes probably increased the formation of nitrates from the accumulated store of nitrogenous organic matter in the soil, and if this is the true explanation, a simple experiment with nitrate of soda would give us light on the subject.

We have a firm conviction that market gardeners are spending a great deal of money for manure to produce results that could be obtained at greatly less cost by the judicious use of chemical fertilizers. But from the nature of the case we cannot ascertain the facts by the use of ordinary commercial fertilizers, for the simple reason that they supply, as a rule, nitrogen, phosphoric acid and potash, and we cannot tell whether it is the nitrogen that is wanted, or whether it is the phosphoric acid that is the chief thing that we need or whether it is the potash, or whether we need all three of these ingredients of plant-food. We have been waiting and writing and talking about this very point for forty years. We have been waiting for the experiment stations. The government has appropriated the money. The stations are established. Now let us have the experiments.

It may be said that the stations are making experiments with the different ingredients of plant-food. Some are, but others tell us to test our own soils, and Dr. Sturtevant, after having charge of the New York Experiment Station, at Geneva, asserted that "plat experiments were useless." If so, it was because his plots were too small, or the land needed draining, or was not properly worked. We are paying about $30,000,000 a year for nitrogen, phosphoric acid and potash in commercial fertilizers. Cannot experiments be made to show what effects are produced by the use of these different ingredients separately and combined in different proportions, *and on different crops?* We want crop tests rather than "soil tests."

Moreton Farm. JOSEPH HARRIS.

ANOTHER POLLINATING KIT.

PROFESSOR Bailey's enthusiasm in the work has led him to describe an outfit for pollination so extensive that many thinking it all necessary, may, I fear, be deterred from practicing this exceedingly interesting phase of horticultural work.

As a result of over twenty years experience, I have adopted for all ordinary work, the following simple and compact outfit. My own "kit" is carried within the covers of an ordinary "Excelsior" diary, about 6 inches long, 3¼ inches wide and about half an inch thick, the tools being easily contained in the pocket of the cover. The tools consist of a pair of slim, pointed pliers, two camel's-hair brushes, a few bunches of worsted yarn of various colors, some small bags made of netting or tarletan, and a lead pencil. This receptacle also holds a pair of sharp-pointed scissors for thinning, etc.

For cross-fertilizing most flowers I have found nothing equal to the pliers above mentioned; almost any flower that needs it can be opened with them, and the whole operation can be performed without change of tools.

To illustrate their use, suppose we wish to fertilize the flowers of the single petunia with pollen of the double form. In this case there is no need of tearing or cutting the corolla, as the anthers do not burst until the flower has opened somewhat. The pliers are introduced and the anthers are quickly picked from the single flower. The double flower, split down one side and the edges turned back to expose the stamens, is held between the thumb and finger of the left hand, leaving the three fingers free to steady the flower to be operated upon. Grasp the stamen of the double flower, with the pliers, just below the anther, and by a slight twist the filament parts, leaving the anther on the point of the pliers.

To touch the stigma with one side of the anther is the work of an instant, and the pollination is complete. If the pollen is abundant, several stigmas can be fertilized with one anther. This method can be used on any flowers where proper development of stigma and anther can be obtained. It is not only the quickest method, but it is also the most economical of pollen, a point of prime importance. Petals and any other interfering parts can be as quickly removed with the pliers as with scissors.

When it has been necessary to gather pollen in advance and preserve it for a time, I have preserved it in flattened test tubes, and have used a fine brush, just oily enough to retain its shape after drawing it through the fingers, to take and apply the pollen with. I shall try Professor Bailey's spatula the first opportunity I have.

The colored worsteds mentioned are used to mark flowers operated upon, and by different combinations they show what the cross has been.

In assisting some of the compositæ to perfect seed, a rather short, stiff camel's hair brush has been found useful to disperse the pollen. The lead pencil, in addition to its use in taking notes, is sometimes handy to disperse or place pollen.

Several years ago I introduced the pliers in one of the largest seed establishments in the country. The late Peter Henderson endorsed it as follows: "Far superior to the usual method with a camel's hair brush." The pliers used are the straight ones, made of steel, that are used with first class microscope outfits. Beware of cheap tools—they are utterly unfit for the delicate work of pollinating.

Buffalo. JOHN T. COWELL.

PEACH GROWING IN THE COLD NORTH.

The peach and apricot must be protected here in northern Vermont. No method of protection that I have ever known is practicable, and at the same time cheap and easy to manage, except the one I shall here describe.

The tree must first be rightly trained, to do which you should procure a tree not more than one year old. A June-budded tree would be good, or better, one in bud. It should be planted where it is wanted to grow, and all branches must be cut off, leaving the central shoot, upon which allow only one bud to grow. The tree should be visited every week or two, and all branches that have started out on the new shoot should be broken off, taking care not to injure the leaf below it. These little branches should not be allowed to get more than an inch or two long. The object is to get a long, slender cane without branches. Fig. 1 shows a tree in training; *a a*, are the little branches near the top that should be broken off. All the others below them have been removed. About four or five weeks before frost may be expected, you should stop breaking off the branches so as to allow the wood to ripen enough to stand the winter. On the approach of freezing weather, place a round block wood on the ground at the root of the tree, and slowly bend the cane down over it and fasten it there with a hooked stick driven into the ground. Then cover the cane with a couple of boards, nailed together at their edges to form a trough. This is all the protection it will need. When the frost is out of the ground in spring, remove the covering and straighten up the tree. After it has begun to grow, cut or rub off all the branches and allow but one bud to grow, and treat the tree just as you did the previous season. At the end of the third season you will probably have a cane long enough for your purpose. Now the tree should not be lifted up in the spring, but is kept in a horizontal position and allowed to grow up at the end and form a head, which should be trained fan-shaped and parallel with the horizontal trunk. Fig. 2 shows a tree trained ready for bearing.

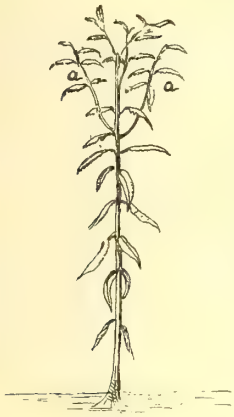


FIG. 1.

There should be a soft pad of straw or cloth between the tree trunk and the block. On the approach of freezing weather loosen the tree from the supporting stake, and after having placed some evergreen boughs or boards on the ground to keep the twigs off the earth, bend the head of the tree down sidewise to the ground, and weight it if necessary; then cover the whole head with boards. I have tried covering with evergreen boughs, covering some trees a good deal and some but a little. Those that had the most covering were killed by the snow drifting in and over the covering, and then turning to ice around the twigs during thaws. Those that were covered the least did better, while some that were laid on the ground without any covering bore some fruit the next season, but there is danger of their being injured by the sun in winter. I now cover with boards, and find it to be the easiest, cheapest and best method.

The object of the horizontal trunk is to have a portion of the tree that can be easily twisted to allow the head to lie flat on the ground, and this trunk meets the requirement perfectly. When I first began this method some told me that the horizontal trunk would soon get too large to be twisted, but this is not the case if the trunk is long enough, for a trunk so trained and supported does not increase in size nearly so fast as a short, upright one does. This trunk should not be less than ten feet long; twenty feet would be better, but it would take longer

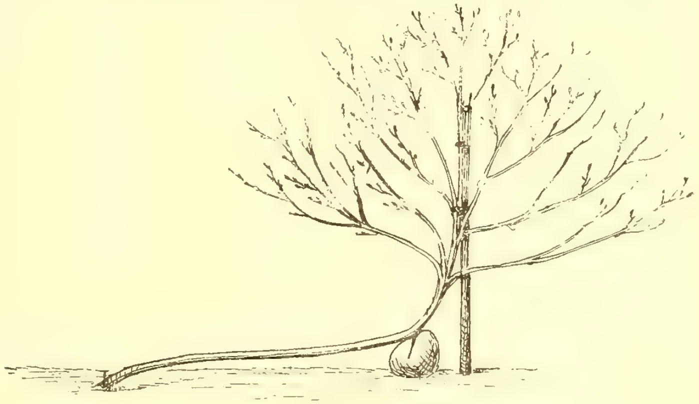


FIG. 2.

to get it. I omitted to say that this low trunk should be protected from the sun during the entire year. Two boards, six inches wide and a little longer than the trunk, nailed together at their edges like a trough and turned over the trunk, will be sufficient.

I began my experiment with about fifty trees which I raised from pits and budded, but during the process of learning my lesson, I have lost all but seven. The covering with boards saved these. They have been in bearing three years, and most of them are fine thrifty trees. I am so elated and confident that I intend next spring to plant out a lot of young trees, which I budded this season.

Besides the peach and apricot, the plum and the cherry can be grown in this way where they will not otherwise succeed. It requires some patience to get the trees into bearing, but when the training is finished it is not so much work to cover one of these trees as it is to prune and cover a grape vine; and who would go without grapes because of the trouble of taking care of the vines?

Vermont. J. T. Macomber.

TRAINING FRUIT TREES.

THE European methods of training fruits to trellises and walls are looked upon as wholly inapplicable to American conditions, yet they can often be employed to good advantage. It is true that our climate does not demand such pains, nor is the system profitable in most conditions, but one who loves good fruit and finds pleasure in handling plants will be gratified with a few espalier or wall trees. The espalier training is essential in the forcing of most fruits, as the nectarine and peach, but they are comparatively few who force these plants in America.

Briefly stated, the reasons for definite training of fruit trees are these: to heighten the flavor and color, to increase size of the fruit, and to advance the season of maturity. These advantages are accomplished largely because of the greater amount of heat and light which the individual fruits receive; but much is no doubt due to the greater attention to manuring and tilling which always attends an extra endeavor.

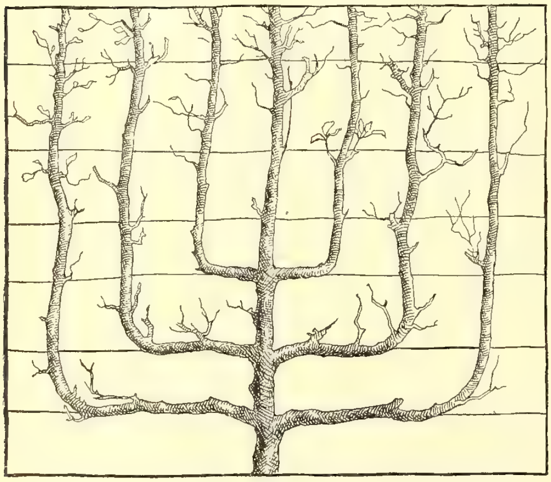


Fig. 2. Pear Trained on Wires.

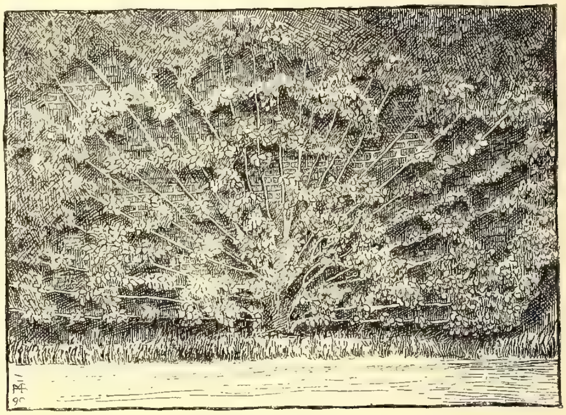


Fig. 1. A Wall-trained Pear Tree.

Training to a wall is a favorite practice. Where late spring frosts are not feared, a wall with a direct southern exposure is desirable. Upon such wall the seasons of growth and maturity are greatly enhanced. But in many places a south exposure is positively unsafe, and a wall facing east or west is preferable. In fact, a north wall, in our hot climate, may give the most gratifying results. There can be no better apricots in this country than those grown at the home of the Hon. James Wood, at Mt. Kisco, N. Y., and his trees are trained upon north walls, where the sun cannot strike the trees before three o'clock.

If a wall of brick or stone is not available, the side of a building or even a board fence may be utilized. Those who have visited the grounds of Ellwanger & Barry will recall a large St. Ambroise apricot trained on the side of a barn. A perfect specimen of wall-trained pear-tree is shown in Fig. 1, which is reproduced from a photograph taken by the writer upon the estate of the Duke of Westminster, Chester, England.

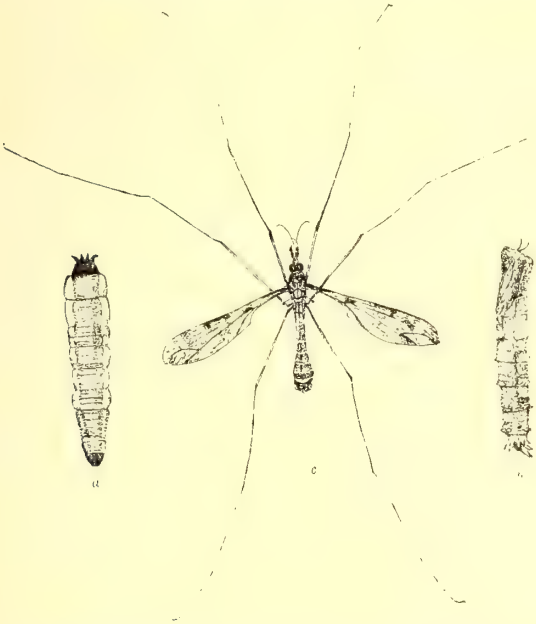
In espalier training, some sort of trellis is substituted for the wall. This trellis is often a cheap affair made of stakes driven into the ground, and held in place by cross-slats. But a wire trellis is usually better and is in common use. This trellis is not unlike an ordinary grape trellis, except that it is usually more strongly built. Fig. 2, taken at Gartenbau Hochschule, near Berlin, is a good illustration of a pear-tree trained upon wires.

It is a simple matter, in principle, to train a tree to a wall or espalier. The only difficulty is the disposition to slight the work. The form which the tree is to a take must first be decided upon, and then operations must be begun upon the tree the first or second year after it is set. A single trunk may be allowed to grow, from which arms are taken at various heights, as in Fig. 2, or the tree may be trained fan-shaped, all the branches starting from nearly a common point, as in Fig 1. The fan-shaped method is the most popular for walls, and is easily managed. It is often a good practice, in this method, to allow the tree to grow at will the first year, and then cut it down to within a few inches of the ground the second year. This insures a strong root, and good branches and rapid ensuing growth may be had for the training process.

L. H. B.

CRANE FLIES AND DADDY-LONG-LEGS.

To the average American gardener the insect shown in its three stages in the accompanying illustration is of no special interest, because as yet it here does very little damage; but in England the case is different, for these crane flies are there among the very worst of garden pests—attacking a great variety of crops, and often inflicting great injury. In some localities in this country the insect has occasionally been destructive, and it is probable that in the future it will become one of the most serious of our already numerous insect pests.

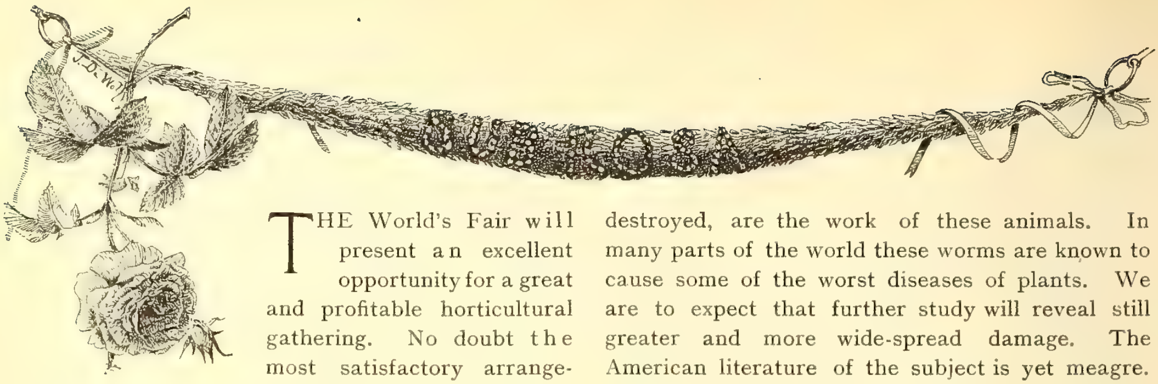


In England these crane flies are commonly called "Daddy Long-legs," but in America an entirely different creature goes by this name—the long-legged spiders. The latter are never injurious, but on the contrary are, like most spiders, beneficial to man by feeding upon various injurious insects.

The life-history of these crane flies is something as follows: The adult flies (*c*) appear in spring, often in great numbers, and deposit numerous eggs in grass lands. In a short time these eggs hatch into small blackish grubs that feed upon the roots of grasses and other plants. They continue feeding for about a year, when they are an inch or more in length, black in color, having no legs, and looking like *a* of the accompanying illustration. They work either beneath the surface of the soil or beneath rubbish on the surface, and probably devour a great variety of food, consuming dead as well as living vegetation. When fully grown they change to the pupa state, represented at *b*, and about a fortnight later the adult fly emerges with its long legs and slender wings. It is a fragile creature, the legs easily breaking off, so that it is the despair of the entomologist who attempts to preserve it for his cabinet of specimens.

There is a large number of species of crane flies, and they vary much in size. The figure represents one of the largest American forms. In England, about the only remedy which has been found effective is the hand-picking of the grubs.

Ohio Experiment Station. C. M. Weed.



THE World's Fair will present an excellent opportunity for a great and profitable horticultural gathering. No doubt the most satisfactory arrangements can be made with the management for space and accommodations for exhibitions. We should like to see an *International Horticultural Congress* assembled at that time. Such congresses are comparatively frequent in the Old World, and here is the opportunity to extend the practice to America. Into this congress all the national societies pertaining to horticulture in this country should come. For once, all faction and clannishness should disappear in a grand effort for the common good. The enterprise should be under the management of an independent committee, which, perhaps, should be named by the National Department of Agriculture, or else be made up of one or two representatives of each of our national organizations.

The botanists are thinking of a similar movement. A congress of botanists and a congress of horticulturists should have much in common, and one should immediately follow the other. Who will push?

* * *

WONDERFUL things are coming to the knowledge of the farmer in these later days. New friends, new foes, new facts of cultivation, are coming so rapidly that we can scarcely keep pace with them. And now comes a new line of investigation which appears to open almost a new science. We are no sooner becoming acquainted with the terms bacterium and microbe than we must familiarize ourselves with nematode. Nematode is a term rather loosely used to designate an immense number of minute true worms which live in animal and vegetable tissues. Similar animals are the "eels" in vinegar and the dreaded trichinæ in pork.

The nematode worms have been brought into prominent notice during the last few months by investigations upon the root-knot of the peach and other plants, and the clematis disease. As many as seventy-five American cultivated plants are now known to be attacked by these minute and insidious foes. The knotty swellings upon the roots of house-grown tomato plants, by which the crop is often destroyed, are the work of these animals. In many parts of the world these worms are known to cause some of the worst diseases of plants. We are to expect that further study will reveal still greater and more wide-spread damage. The American literature of the subject is yet meagre. A bulletin by Prof. Scribner, of Tennessee, one by Dr. Neal, of Florida, issued by the Department of Agriculture, another by Professor Atkinson, from the Alabama Station, and a paper presented to the Western New York Horticultural Society, by Professor Comstock, of Cornell, comprise the sum of it. Here is a science which is entirely distinct from insects, fungi or bacteria, and the study of which demands special training.

* * *

TO raise a good crop is not the sum of farming, for farming now-a-days is become a business, and it is governed by the laws of business. Farming is selling as well as raising. The markets are as important as the land. There are ten men who can grow good crops where there is one who can sell them to advantage.

The farmer must study markets, and he must adapt himself to them. There are laws of supply and demand, and there are peculiarities of particular markets, of which the cultivator has no inkling. Breadth of vision characterizes the man who in these times succeeds. We are fond of thinking that the farmers must combine in order to secure higher prices. Combination may reduce carriage and commission, and it may now and then obtain trifling and temporary concessions in prices, but it can never overturn or control the laws of trade. Higher prices are not coming to the farmer. The farmer must improve his methods. Better times do not come to the farmer by combination.

* * *

THE New York Florists' Club is out with a circular asking the members to interest themselves in an exhibition to be held early in November next. This is a move in the right direction, and, as the committee having the matter in charge is composed of truly representative men, full of zeal, and with the best interests of the craft at heart, there is no reason why an exhibition cannot be made that will far surpass those grand affairs formerly held at the Madison Square Garden.

We need not discuss the causes of the failure so apparent in the exhibitions held during the last ten years; we merely note the elements of success under the control of the members of the New York Florists' Club, which are more abundant than in any other part of the world. Roses, chrysanthemums, decorative plants, fruits and miscellaneous cut-flowers can be brought together here in sufficient quantities and variety to make an attractive exhibition each by itself, while a combination of the whole, with taste and harmony in their arrangement, would make a display far surpasssing any previously witnessed. Harmony among the exhibitors is the only element needed to make success certain, and of this there is, at present, a superabundance. If President John May will only keep this from evaporation, he will confer a great favor on all lovers of flowers.

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SENSE of proportion seems to be unknown to many minds. A single fact or observation impresses itself upon the mind and generalizations are made from it, even though they may be contradicted by a dozen other facts just as positive; and this unbalanced mind insists upon its generalization with all the stubbornness of bigotry. In fact, just this feature of thought is the chief curse of our agriculture, for it runs through all transactions and all practices.

It is admirably illustrated by the current discussions of grafting, particularly across the Atlantic. During the last year the whole practice of grafting has been denounced as unwise and unscientific, and numerous instances have been cited to prove that it is followed with ill results. But why will not these writers make a corresponding citation of cases in which good results have followed? In other words, why cannot fairness and honesty be used here as well as elsewhere? We grant that instances are many in which ill results follow grafting and budding. We will suppose, in extravagant liberality, that any writer knows ten thousand such instances; then, in honesty, let him count the trees in our orchards, the trees on our lawns, the shrubs in our greenhouses, in which grafting is not only beneficial but essential. If one man is a cripple, does the fact prove that all men cannot walk?

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THE want of encouragement with which horticulture is treated in many localities is often bewailed, and the poor display made at exhibitions in localities horticulturally rich is a matter of great comment. Sometimes the causes that operate to produce this are beyond the control of the societies holding the exhibitions, but would it not be well for the executive officers this season, while making plans, to carefully consider once more the matter of premiums? "Premiums too small," is the general complaint among would-be exhibitors; the societies admit it, but say that they can afford no larger ones. Yet they can afford $25 for a horse or cow and only 50 cents for a show of flowers! One of our state societies offers $50 for the best Shorthorn bull, and not half as much for the best general collection of cut-flowers. Yet the expense of taking the animals to the exhibition is rarely as much as it is for the flowers. The flowers are worthless at the close of the fair, no matter how much money and labor have been expended on them. The animals are quite as good as when they left home, and if they receive favorable notice or a prize their value is increased. Often they find a purchaser on the spot at a handsome profit. It is too much to expect us to sacrifice $50 worth of flowers of our growth or purchase, for the chance honor of getting a $10 or $20 premium for the best floral work. A good flower show will attract more visitors than any department of a fair, except the horse races.

⁂

THERE are few who have not read of "The Angelus," a little picture that has been exhibited for some time past by a firm of picture dealers in New York. Thousands of people have paid for the sake of looking at it, and have regarded it with varying emotions. Many do not hesitate to say that they regard the whole thing as a "fake," gotten up to enrich an ingenious company of speculators. Poor Millet, when he painted it, had hard work to sell it at any price. Were he alive and able to furnish many pictures, he would likely find it as difficult to profit by them as by this one. His pictures are now "boomed" and advertised in the most skilful and ingenious manner, until those unlearned in art are silenced. Undoubtedly the Angelus shows brush-work and a luminous quality of the atmosphere both in the lights and shadows that are fine, but these are artistic points only appreciated by few out of the many thousands that look upon it. But we are told that it is the exalted sentiment which the picture shows, that gives it value and teaches us that there can be a beauty even in the most barren lives. Let us consider it from this point of view, and see if its lessens are moral and good! Poverty and hardship are hard to bear in all parts of the world, and we welcome any true alleviations that come to the lot of those compelled to endure them, but we think modern knowledge and appliances will do more for us than the methods of the middle ages. If, as we are told, this picture truly represents the condition of many people, it is indeed depressing. Their prayers must be for deliverance, not of thanksgiving. They and their ancestors have bowed their heads at the sound of the Angelus bell for many generations, but if the lot of the present generation is an improved one, that of the others must have been worse than despair.

In slowly harvesting such a poor crop of potatoes, any excuse for a pause would be welcome. Let any of us attempt to dig a field of potatoes with a three-pronged fork whose only handle is a straight stick and we will incline more to profanity than prayer. Let any American woman take a heavy load on a rough wheel-barrow like than shown in the Angelus, and wheel it over newly dug ground and see how loud she will "lift her voice in prayer and thanksgiving." Yet such women as the picture shows spend their lives in this work, and contentment is preached to them as the greatest of virtues. We think that better tools and knowledge of cultivation will do more for these people than the practice of mediæval customs. Let those who disagree with this, get a pair of wooden shoes and wear them one day! To us the picture is depressing in its spirit and teaching, un-American, superstitious, and useful only as an example of what our country should avoid. May the bells of America send their sound over well-tilled gardens and fields, unto the ears of a progressive and intelligent people, whose lives under our beautiful skies can combine the color and picturesqueness of old world life without its horrors, bigotry and immoral ideas! May our gardens combine the good of nature and art from every land, but may we lead the world rather than follow it!

⁂

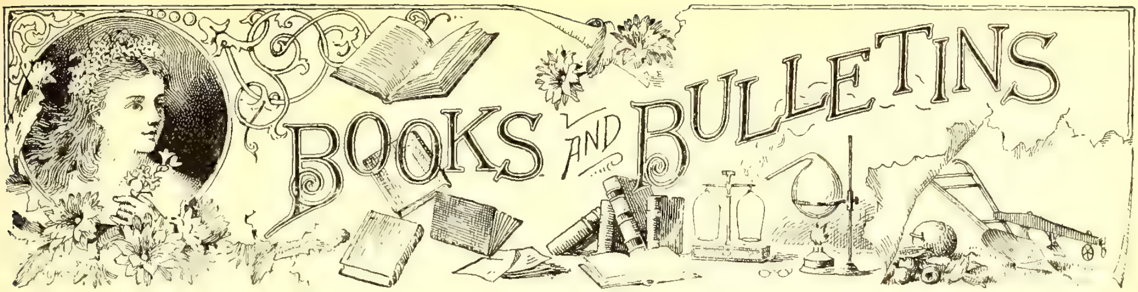
"PURCHASE and distribution of seeds by the Department of Agriculture shall be confined to such seeds as are rare and uncommon to the country, or such as can be made more profitable by frequent changes from one part of our country to another; and the purchase or propagation and distribution of trees, plants, shrubs, vines and cuttings shall be confined to such as are adapted to general cultivation, and to promote the general interest of horticulture and agriculture throughout the United States." This is the statute which creates the seed bureau of the National Department of Agriculture. The intent of the law is clearly beneficent, and were it followed, great advantages would come to our agriculture. The clause which defines the Department of Agriculture itself directs that "to procure, propagate and distribute among the people new and valuable seeds and plants" is one of its leading functions. It is well known that the department does little of the sort, at least, so far as seeds are concerned. In fact, gardeners, at least, have long since given up any expectation of receiving from Washington anything "rare and uncommon," or such as has been made or is likely to be made, through the efforts of the department, "more profitable by frequent changes from one part of our country to another." Perhaps, upon second thought, however, we should admit that things "uncommon" are often enough submitted to the unsuspicious cultivator, for Bill Nye's ecstacy over a choice parcel of cotton seeds sent to him in Wyoming from Washington is still fresh in our minds; and we ourselves have been the recipients of seeds of cotton and tobacco in quantity, while we were living in a country where these products would be little more than a practical joke.

For years we have had and grown these seeds from the Department of Agriculture, and we have never found among them anything of superior or unusual merit; and when we are particularly anxious to have a good crop, we never touch them.

What can be the excuse for sending out such seeds as these? Any large dealer sells them, and some of the varieties are older than the Department of Agriculture itself. Why have all the complaints and denunciations of the press and of good gardeners for years borne no fruit of reform?

But it is an easy matter to account for much of the persistence of this disgrace: two-thirds of all the seeds are distributed by members of congress. The seed-shop is a convenient means, maintained at public expense, by which the congressman "remembers" his "friends" at home. It is a political attachment rather than an agricultural one, and therefore reforms are difficult. But if we despise the politician who uses the seed-shop for his personal ends, what shall we say of the voter who is influenced or won by such paltry means? But it is the "remembrance," that a public man thinks of him, which gratifies the vanity of the witless sower.

It is a part of the scheme of the Department that reports shall be made of the behavior of these "rare and uncommon seeds." This is well, but two factors prevent its complete operation: First, the seeds are usually not worth reporting upon, for the varieties are well known; and, secondly, the two-thirds over which the department has no immediate control are not reported to it. One commissioner complained mildly of this, adding, "it is obvious that these representatives of the people are better acquainted with the best intelligence and needs of their respective districts than the department is." So!



BOOKS AND BULLETINS

Root-Knot, by Dr. Neal.

Bulletin No. 20, Division of Entomology, United States Department of Agriculture. *The Root-Knot Disease of the Peach, Orange and other Plants in Florida, due to the work of Anguillula. By J. C. Neal. Pp. 31. XXI Plates, mostly colored.* The root-knot disease of many plants, particularly in the south, has become serious and wide-spread. The difficulty is not a new one, for Dr. Neal tells us that it has been known "since the earliest settlement of the South Atlantic and Gulf States." "About 1874 this disease sprang into prominence owing to the influx of immigrants, the development of early market gardens, and the sudden rage for orchards of peaches, figs and oranges." Many plants are attacked by the nematodes, and as some pernicious weeds are among the number, the danger of infection is increased wherever cultivation is slack. The cultivated plants which are attacked embrace "the greater part of our most valuable food plants, fruit trees, and many of the choicest flowers." The knot is caused by a minute true worm, to which Dr. Neal gives the name *Anguillula arenaria;* but the animal was long ago described and named, and it is properly known as *Heterodera radicicola.* The worm lives in the soft tissue of the young or herbaceous roots, causing a swelling or knot to form. This knot takes characteristic forms in different plants.

Dr. Neal concludes that "the disease is unknown beyond any point in the interior 150 miles from the coast" of the southern states. This, however, is a mistake. It is well known in many northern gardens, particularly upon tomatoes, the clematis and other herbaceous or soft-rooted plants. The disease is worst in moist or wet sandy soils, and upon young trees. If trees become thoroughly established, little injury need be apprehended. In the way of remedies, Dr. Neal advises the following: drainage; exposure to frost; heating the soil by burning brush or weeds on it; filling the hole in which trees are set with uninfested soil; disuse of land for a time, in order to starve the worms; the encouragement of a "small, blackish-brown ant," which feeds upon the worms and which prefers dry soils; the use of various alkalis upon the soil; the planting of non-infected stocks.

The bulletin is designed as a practical discussion of the subject, rather than a scientific contribution.

Root-Knot, by Atkinson.

Bulletin No. 9, Alabama Experiment Station. *Nematode Root-Galls. By Geo. F. Atkinson. Pp. 54. VI plates.* This is the first number of a series of "Science Contributions" from the Alabama Station, and it is the most studious and best effort yet made in this country upon the root-knots. The paper is mostly of a technical nature. The author enumerates 36 species of plants which are affected by the nematode. The plants which are most injured, according to the observations made at Auburn last year, are potato, tomato, a species of abutilon, cow-pea, bird's foot clover, sunflower, watermelon, musk melon, cabbage, ruta-baga, parsnip and salsify. The treatments suggested are as follows: Sterilization of the soil by starvation; rotation of crops; clean cultivation; planting of healthy stocks; care in making composts; trapping the worms by means of "catch plants." This last method has been used with great success in Germany in dealing with a similar disease of sugar beets. Plants on which the nematodes thrive, but which mature in a short time, are grown and then pulled and burned.

Olives.

Bulletin No. 85, California Experiment Station. *Observations on Olive Varieties. By W. G. Klee.* The importance which olive culture is beginning to assume in California renders this first account upon the subject from any American experiment station both interesting and valuable. The bulletin does not pretend to have reached great results at this early date; but it presents an important and novel feature in classifying the leading varieties in reference to the proportion of pit to the remainder of the fruit. This relationship is a vital point, both to picklers and oil makers, and it appears to vary much between varieties. The following figures indicate the proportion, in bulk, which the pit bears to the pulp: Regalis, 7.8; Manzanillo No. 1, 8.3; Nevadillo Blanco, 10; Pendulina, 11.5; Columella, 11.8; Mission, 15.6; Polymorpha, 15.8; Rubra, 16.7; Rock's Oblonga, 18.3; Mignola, 29; Redding Picholine, 33.3; Uvaria, 34.2.

Bulletin No. 4, Virginia Experiment Station. *A Study of Tomatoes. By Wm. B. Alwood and Walker Bowman. Pp. 18.* "As one among such special crops, the culture of tomatoes holds a high rank. Statistics sufficient to give definite information in regard to the money value of this crop in Virginia have not yet been collected by the Station; judging, however, from general statements, there must be in this state no less than eighty, and probably as many as one hundred, canneries working on this crop, either alone or in conjunction with other fruits. In addition to this, the market crop grown in the vicinity of Norfolk and on the eastern shore will reach about one-half of the value of that used in the canneries. Hence, it seems fair to say that the value of the tomato crop grown for these two purposes alone

—for the canneries and for market—cannot fall short of $1,000,000 annually. This takes no account of what is grown in a general way for local markets and home consumption."

Tomatoes in Virginia.

"A matter of cultural importance, to which attention is here called, is that of transplanting the plants instead of permitting them to grow without disturbance from seed until put out in the field. The large number required for the extensive areas cultivated by the packers make this a formidable task, but at least one transplanting will prove decidedly profitable to them in the vigor and productiveness of the resultant plants. With experience, men acquire dexterity in the handling of small plants, and the labor is not so formidable as it at first appears. Some growers do practice transplanting, but others do not."

Ideal Canning Tomato.

"The special value of a variety of tomato for the large canning industry of this state and for market purposes must lie in its being a strong, vigorous grower, productive, yielding fruit of good size and smoothness, reasonably early, carrying its fruit through a good length of season without its deteriorating in quality, and (if this character can be had in the larger varieties of the tomato) freedom from fungous diseases. Observation leads to the belief that this latter characteristic in the large fruited sorts is more dependent upon season, situation and culture than upon variety. Further, solidity, *i. e.*, firmness and capacity to stand up well under shipment and other handling operations, is a character of prime importance, but one on which judgment is not easily rendered. In general, this point includes both firmness and keeping quality, which are by no means identical and are possessed in different degrees by different varieties."

Varieties of Tomatoes.

"Some plants of Paragon did well, but it seemed on the decline. This was also very noticeable of some plants of Beauty, but on the whole, this variety yielded some of the finest fruits grown on the trial ground. Acme fully sustained its reputation as one of the best all-round sorts. The crop was uniform and of fine quality, yet was somewhat more affected by the rot than some others. The purplish color of this variety may be objectionable to some, yet there are none can be so warmly recommended for general culture. Conqueror and Comet show the heaviest yields, but have little else of merit. They bore very abundant crops, but the fruits were small, and, after the first pickings, degenerated rapidly in quality. Dwarf Champion, one of the prominent novelties for the last two seasons, was not productive (one of the plants being entirely sterile, though it grew and bloomed vigorously). The fruits are of fine shape, color resembling the Acme, plant not quite strong enough to bear its fruit free from the ground. The indications are that it requires high culture and will be valuable as an amateur sort, but not for general culture. Extra Early is a very prolific early sort, but the fruits are small and not of extra quality. Lorillard is a new variety of some promise. The fruits are of good size, fairly smooth, of fine crimson color, but for general culture it does not surpass some of the best previously mentioned. It is of Trophy type, and recommended as a forcing variety. Mikado is one of the best of the potato-leaved sorts, but there is some difference in stock of seed as to productiveness and character of fruit. This was plainly indicated in the test here the past season. Selection has been taken with a view to establishing a better type of this variety. It has a small growth of vine, hence can be planted closely, and is very susceptible to trellising. This variety produced some of the largest fruits grown here the past season. Shah is quite similar to Mikado in growth and general appearance, but its color is yellow."

Composition of Tomatoes.

In nine varieties the per cent. of water in the fruit was found to be, on the average, 93.63. The fertilizing value of 3,938 lbs. of tomato vines—the estimated produce of an acre—was found to be as follows:

Fertilizing Ingredients.	*Weight.*	*Valued at*
Nitrogen	12.95 lbs.	$1.94
Phosphoric acid	3.40 "	.24
Potash	24.14 "	1.20
Total value of fertilizing ingredients		$3.38

"A question just here of practical importance should not be overlooked by growers. It is that the vines should not be allowed to decay in the open air, as in this way a large part of the nitrogen they contain, and which is their most valuable fertilizing ingredient, would escape, in the form of ammonia, into the surrounding atmosphere. The same thing would occur should the vines, after becoming sufficiently dry, be burned. This is a practice that has been recommended in order to destroy the germs of fungous diseases that affect the tomato. By plowing under, the same end will be attained without loss of nitrogen. In the case of a heavy clay soil, this would also have the effect of loosening the soil, securing a better tilth and more rapid decomposition of organic and mineral matters in the soil."

Tomatoes in Jersey.

BULLETIN NO. 63, NEW JERSEY EXPERIMENT STATION. *Experiments on Tomatoes. By Edward B. Voorhees. Pp. 27.* "It is estimated that the consumption of tomatoes has increased four-fold in the last ten years. The soil and climate of New Jersey are well adapted to the growth of this crop, and it now forms an important farming industry of the state. There are in this state, 73 tomato canneries, located chiefly in counties south of Middlesex. Statistics secured by this station from both canners and farmers show that at least 15,000 acres are devoted to the raising of tomatoes for these canneries; that the average yield per acre is from 8 to 10 tons, with a minimum selling price of $6.50 per ton, delivered at the canneries. Statistics secured in regard to the raising of tomatoes for he general market, while less complete, indicate that the acreage is at least 2,000, with an average yield of 6 tons per acre, and an average selling price of 25 cents per basket of 30 pounds. Calculations based on these statistics show that the annual value of the crop to the farmers of New Jersey is over $1,000,000. As compared in point of money value with the staple crops grown in the state, tomatoes rank *below* hay, Indian corn and potatoes, *with* wheat, and *above* oats, rye and buckwheat."

Fertilizing and Yield.

"Practical experience in regard to the growth of the crop has led to the belief that while both barnyard manure and commercial fertilizers increase the yield, it is at the expense of maturity, especially in the case of fertilizers; and that the best effect of barnyard manure is shown when it has been applied in the fall previous to the year of growth." In order to determine the influence of fertilizing upon the yield and maturity, extensive tests were made with nitrate of soda, with the following results: 1. That nitrate of soda, while increasing the yield, does not do so at the expense of maturity when a small quantity is used, or when a large quantity is used in two applications. 2. That nitrate of soda increased the yield at expense of maturity when used in large quantities in one application. 3. That nitrate nitrogen is the ruling element in the growth of tomatoes, and that its best effect is dependent upon the method of application, and on the presence or absence in the soil of a full supply of the mineral elements, phosphoric acid and potash. "Nitrate of soda was effective in increasing the yield in every case. It was effective in increasing maturity from both the standpoints of yield and money value on six out of the eight plots upon which it was applied." "The increase in yield from the least effective use of nitrate of soda was 226 baskets" on one-twentieth of an acre, as compared with unmanured soil.

Composition of Tomatoes as influenced by Treatment.

Investigations were made to determine what effect the nitrate of soda may have upon the composition of the fruit and vines "In the average composition of the tomatoes from the plots on which nitrate was used alone, and those on which it was used with phosphoric acid and potash, the carbohydrates and moisture are practically identical, while decided differences are noticed in proteine, fat and ash. The proteine is 10 per cent. lower, the fat 14 per cent. higher and the ash 20 per cent. higher when the nitrate was used in connection with phosphoric acid and potash; and in both cases there is an increased percentage in all classes of food compounds over those found in the sample taken from the unfertilized plot, and equal in every respect to those from samples on the manured plot. This result is just the reverse of the quite general belief, based largely upon prejudice, that garden produce grown by the use of artificial fertilizers is watery, tasteless and less nutritious than when grown without fertilizers or with barnyard manure. The tomatoes were a magnificent crop in every respect; large, smooth and solid. Upon cutting the tomatoes at the time of sampling, a very decided difference in the appearance of pulp was noticed. Those from the nitrated or manured plots were much more solid and with less seeds than from the unmanured, or from the plot fertilized with phosphoric acid and potash. What appeared a decided difference to the eye is confirmed by a chemical analysis."

Effect upon the Land.

"A crop of tomatoes removes twice as much potash and over 50 per cent. more nitrogen than either a crop of white or sweet potatoes; nearly twice as much phosphoric acid as white potatoes, and more than four times as much as sweet potatoes." Wheat, oats and timothy hay remove more nitrogen than tomatoes do, and timothy hay removes over 50 per cent. more potash."

BULLETIN NO. 7, HATCH EXPERIMENT STATION OF MASSACHUSETTS. The horticultural portion of this bulletin, by S. T. Maynard, was reviewed last month, save that the following paragraphs were omitted.

Sweet Corn from East and West.

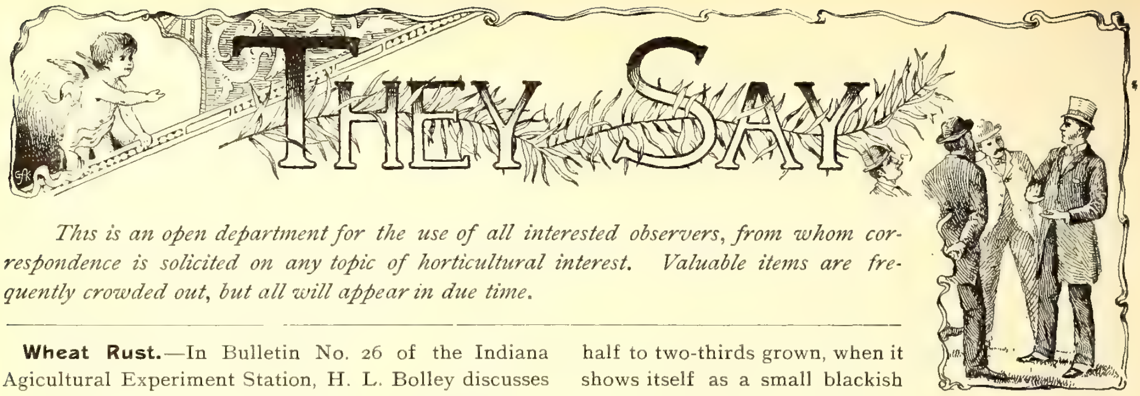
Many varieties of sweet corn, of which samples were grown in New England and some of the Middle States, were tested for the purpose of determining what influence locality may have upon the quality. Chemical analyses were made "when the kernels were just passing from the milk." The results were indifferent. Sulphate of copper placed in a Paris green mixture and sprayed on potatoes, appeared to check rot.

Protection from Rats and Mice.

Experiments of last year have been repeated. Lime, cement and Paris green washes are all good. Their adhesiveness can be increased by the addition of skim milk. A paint is made of Portland cement and milk, and to each two gallons a tablespoonful of Paris green is added. L. H. B.

Liberty and a Living.

LIBERTY AND A LIVING. *The Record of an Attempt to secure Bread and Butter, Sunshine and Content, by Gardening, Fishing and Hunting. By Philip G. Hubert, Jr. G. P. Putnam's Sons., Publishers, New York.* Mr. Hubert's bright and earnest little book is an inspiration to country living. It is not a romance of the kitchen garden, but the true story of a man who, for years, worked on the big papers in the city—for a living and nothing more. Only a comfortable living in the city with never a sight of the fields, the woods and the sea. He at last decided to live in the country for the greater part of the year and to make a garden assist in supporting his family. He took up gardening, not to make money, but to save money. The idea was that, as a literary man, he had every day from one to four hours spare time, and that if these odd moments were spent in a garden the labor would be of benefit to his health and would pay a good return in fruits and vegetables that he could sell to himself. His garden proved a success and made it possible to live in the country nine months of the year and made the work of earning a living less laborious. He won food from the ground for his little ones, contentment, happiness and glorious good health for the entire family, and his very clear book sets forth just how. C. B.



THEY SAY

This is an open department for the use of all interested observers, from whom correspondence is solicited on any topic of horticultural interest. Valuable items are frequently crowded out, but all will appear in due time.

Wheat Rust.—In Bulletin No. 26 of the Indiana Agricultural Experiment Station, H. L. Bolley discusses at length the question of wheat rust. This disease of the cereal has generally been attributed to the growth of the fungus *Puccinia graminis*, but the author shows that two other sub-epidermal rusts, *P. coronata* and *P. rubigo-vera*, also play a very important part in the damaging of wheat. The wheat rust belongs to the so-called *heteroccisimal* fungi, which produce in one season several apparently distinct stages. These stages are three—the production of the æcidiospores upon the barberry early in the spring; the production of the uredospores, later on, upon the wheat plant, and finally the production of the telentospores or black rust, often in the same pustules with the uredospores.

Heretofore it has generally been supposed that the first infection of the wheat plant came from the æcidiospores of the barberry, and upon this ground it has reasonably been supposed that a destruction of the barberry meant protection from rust. The author holds that the first or æcidium stage is not a necessary stage in the rust of wheat, and that more danger may lurk in old wheat stubble than in barberry bushes, however near.

The fact proved by the author that the threads of one species of rust, *P. rubigo-vera*, may remain alive through the winter in the old wheat plant is of great importance. For upon the advent of warm moist spring weather these deeply-rooted threads give rise to an abundant crop of uredospores, enough to infect a whole second year's growth. Winter wheat, according to the author, sown upon stubble fields from which a crop of wheat or other small grain has just been taken, is particularly liable to an attack of rust; he therefore advises the thorough burning over of the old stubble to destroy all spores and every trace of fungus thread (mycelium).

Some additional conclusions of the author are:

1. Moist conditions are most favorable to the development of rust.
2. Low lying rich soils are most subject to the disease.
3. It is believed that an excess of nitrogen in the soil will produce a wheat more liable to rust; hence the author advises the use of non-nitrogenous fertilizers.
4. In districts liable to severe visitations of the disease, early ripening wheats are to be preferred.

Black Rot of the Tomato.—In the report of the Department of Agriculture, 1888, Mr. B. T. Galloway discusses the above disease of the tomato. The disease generally appears at the apex of the fruit when one-half to two-thirds grown, when it shows itself as a small blackish spot, which rapidly increases in size. As the disease progresses, the tissue beneath the diseased area collapses and the fruit, as a result, becomes flattened. This flattened area becomes hard and leathery, and assumes a greenish black velvety appearance. The author finds this disease to be the result of two species of fungi, the *Macrosporium tomato* and the *Fusarium solani*.

The author advises the burning in the fall of old vines, also the burning or burial of all affected fruit, in order to destroy as much of the infecting material as possible. The excessive use of stable manure is not advised, inasmuch as it is believed that thereby the tendency of the fruit to crack is increased, the fissures thus caused opening the way to the entrance of spores. No experiments with fungicides have yet been tried.

Black Rot of the Grape.—In the *Journal of Mycology*, vol. 5, No. 2, Mr. B. T. Galloway gives the results of an interesting experiment respecting the ascospores, or winter spores, of the grape rot. It is well known that it is this last set of spores, living in the berries throughout the winter, which carries the disease over from one season into another. They are, therefore, found during the spring and early summer months in the old berries which were affected the previous season with the disease.

Old berries, which had laid on the ground all winter, were collected May 10, 1888, and buried to the depth of three inches in garden soil. On the 22d of April, of the following year, these berries were dug up and examined microscopically, with the result that the pustules were entirely empty of all spores. The supposition is that during the first summer the ascospores escaped from the berries, germinated in the warm moist earth and then died.

This experiment makes it probable that the plowing under of old berries in the spring may become a cheap and easy way of getting rid of an enormous quantity of infecting material before the rot has time to make its appearance.

Leaf Spot of the Rose.—In the report of the Department of Agriculture, 1888, Mr. B. T. Galloway describes the above disease of rose leaves. The trouble must not be confounded with the black spot, caused by an entirely different fungus (actinonema). In this latter case the spots are always black from the beginning, and with no reddish tinge. In the present disease the spots are red, or black with a reddish border. As the spots increase in size, the centers become light brown or even grayish. The disease is due to the fungus *Cercospora roseacola*. As a remedy, prune severely and burn all diseased parts. Keep the ground loose and set out in dry airy situations.—FRED'K D. CHESTER, *Del. Expt. Station.*

Corn Smut.—Upon p. 289, AMERICAN GARDEN for August, 1889, W. H. Bull states that "my neighbor, a careful observer, says that the smut on sweet corn is produced by the winds that break the stalks at the root when the corn is in the silk. Earlier or later it will not produce the same result."

Corn smut is a parasitic fungus that usually makes its appearance upon corn about the time of flowering. The stalks may be apparently in a healthy state, growing vigorously and having every indication of thrift. The first mark of disease is the starting of small swellings upon various parts of the plant. They may occur any where between the surface of the ground (the root is never affected) and the tips of the tassel, but oftenest within the ear.

It was formerly thought that the disease was worse in wet seasons than in dry ones. The past season was exceptionally dry in this section until after the middle of May, the rainfall during March and April being only 1.82 in., with none at all in May until the seventeenth. Earliest sweet corn, Cory and Triumph, began to smut with me soon after the first rains, or as soon as it began to blossom, while that planted later, which had an almost continuous soaking through latter part of May and all of June, was very free from the disease. Other observations have shown that it may be very destructive in exceptionally dry seasons, seasons in which the drought has extended over the entire corn-growing period.

This fungus is so prevalent at times as to seriously affect the profits of market-gardeners who grow sweet corn, and unless some combined effort, based upon exact knowledge regarding its habits and method of propagation, is made to stamp out the disease, we may expect it to continue and to increase in destructiveness.

The dry powder that exudes upon the bursting of the epidermis of the swellings above mentioned, as the plant approaches maturity, contains the spores, which are distributed in many ways, and which may perpetuate the disease indefinitely, as it has been ascertained that they will retain vitality for at least two years.

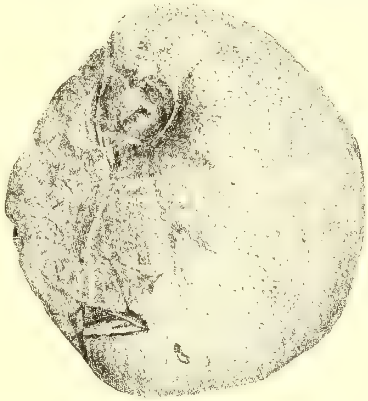
If the bunches of dry smut are left upon the stalk, or if broken off and thrown upon the ground, the spores will be taken up and scattered by the wind. If thrown into the manure or compost pile, they will germinate and grow, and when the manure is spread where corn is to be planted, will be ready to again seize upon the young plants. Smut should not be fed to cattle because in quantity it is injurious, while it will pass through their intestines without injury to itself, and infect the manure as before.

Smut does not exist in the seed, but being distributed upon the land, in these ways it enters the plant while the latter is young, and grows with its growth, making its fullest development about the time the plant is ready to develop its fruit. Its injurious effect is then most apparent, as it draws to itself the nutriment that should go to form the perfect ear and grain.

Prevention is the only cure for the trouble; applications to the growing crop cannot reach the seat of the disease. If cut out as soon as it appears, or at any time before it bursts through the covering, while it is yet a damp, slimy mass, the spores will not mature and it may be merely thrown away. If allowed to reach the powdery stage, it should be burned, or buried so deep that the plow can not bring it again to the surface.

Land infected by it should be cultivated at least two years with other crops, after which probably most of the spores will have perished.

Corn is not often injured much by the wind ("the stalks broken at the root") until it has reached a stage of considerable development, that is, until it is high enough to be blown down. This is about the time it is ready to flower, and is the period at which the fungus, if present, will become prominently visible.—JAMES K. REEVE, *Ohio.*



Bordeaux Mixture for Apple Scab.—The Department of Agriculture reports that copper compounds, such as eau celeste and the ammoniacal solution of carbonate of copper, have been found effective in preventing apple scab. This is an important step in advance, but those who try it, should not use the Bordeaux mixture, which stays on too long and disfigures the apple. The accompanying figure represents the effect it produced on some Ben Davis apples to which it was applied but once.—C. M. W.

Prairie Soil and Moisture.—It is known that the black soil of the prairies is very rich in humus or nitrogen, strong in potash, and with a sufficiency of the phosphates for all common crops, and beside these qualifications it is very finely divided in material substance. With these excellencies, one would think it were an easy matter to propagate plants from cuttings in it, and that other plants with roots, transplanted, would grow off at once. But such is not the case. Success with cuttings is a difficult matter, even in a cool and moist season, and out of the question in droughty summers, while more transplanted young fruit and shade trees die than under almost any soil and circumstances. The explanation is thought to lie in the hygroscopic capacity of the soil, owing to the presence of a large per cent. of humus and the fine division of its particles. Thus the soil may contain moisture enough to provide for the solution of the plant food, but the hygroscopic attraction is stronger than the force that feeds the plants, and the roots starve to death. It is, probably, due to this soil peculiarity that fruit trees have died and will continue to suffer, in a large portion of the valley of the Mississippi, west of the Wabash, north of the Ohio, south of the Great Lakes and east of the Rocky Mountains. On a soil of less hygroscopic capacity, the average annual rainfall of 40 to 45 inches is found sufficent; hence, in certain narrow areas, in the valleys named, the fruit trees are reasonably healthy and bear semi-annual, if not annual full crops.—B. F. JOHNSON, *Illinois.*

[NOTE.—It is doubtful whether the soil has anything to do with these difficulties. So far as trees are concerned, the arid atmosphere is at fault. The moisture is carried off faster than the mutilated roots can supply it, and cuttings from trees with low vital power never have the chance to grow that cuttings from more robust individuals have.—THOMAS MEEHAN.]

Cassava.—The eatable part of the cassava is the root, which grows from 3 to 5 feet long and from 3 to 4 inches in diameter. The appearance of a broken root is enticing, resembling a huge pink radish. When eaten raw, they have a peculiar nutty flavor. Cassava is used here in all kinds of pastry, in a grated state mixed to stiffen cakes, puddings, custards; mixed with equal proportion of cornmeal and made into fritters it has the flavor of fried oysters. The stalk attains to the size of a small tree or large bush. We cut the stalks in pieces 4 inches long and set out on wide rows 6 feet apart and set 4 feet apart on the row. The bush is an ornament to any garden.

For feed for cattle, hogs, sheep and poultry it is very fine. Hogs will quit corn for it and thrive and fatten very fast. Milch cows fed on it give a richer flow of milk than from any other food.

The roots or tubers will not keep a week in open air. We dig them as we want them. The roots keep all winter here in the ground and we turn our hogs on them in the fall, and by January they are fat. This plant is now attracting a great deal of attention here in the South. Every one who has seen or tasted the cassava is going to plant a patch of it this year. It is planted from the first until the last of April, and then it can be multiplied again by pulling up the suckers and cutting them in pieces about 5 inches long and setting perpendicularly in the ground. One must not expect as large and as well developed tubers if planted after April. Late planting is mostly resorted to in order to multiply the plants fast, to make stalks large enough to put away for next year's planting. The stalks are kept over winter by first selecting a dry place or knoll where the water does not stand. A layer of stalks and a layer of sand are placed on top of one another until a rather steep bank is made, and then we place a shed over that to keep off the rain. It needs a certain amount of dampness, but not too much.

I candidly believe that there is no other single article of food on the face of the globe that will go further toward sustaining animal life than the cassava, and there is nothing of the root crops that will outyield it.—J. L. NORMAND, *Louisiana.*

Melon Notes.—The ripeness of a melon is unmistakeable. The watermelon gives forth a dull dead sound when thumped; the bottom is hard where the light shade is, and the fruit, when stirred, almost parts from the vine. A melon should never be pulled in the heat of the day, but in early morning or late evening for best flavor. Placing it for a time in a dark, cool place makes a surprising difference in taste.

A clover sod is the ideal soil for this delicious fruit. Plowed under in early fall in full blossom, then re-plowed in spring, very thoroughly harrowed, liberally dressed with fully rotted manure, again harrowed both ways, and you have ground that you may count on for monster melons, season favoring. Sprout your seeds—several years old—in inverted sod, two vines to the hill. Keep hills solid—never loosen—prune suckers and too redundant vines, cultivate and harrow as long as growth will permit, then ply the hoe continuously. Remove misshapen ones and here and there one when they set too thickly. I have had three dozen on a hill, by far too many for best results. The best thing in cultivation is to mulch them with straw.

Varieties are legion, but few "pass muster." I have tested many. Florida Favorite is a favorite with me. The old Ice Rind holds its own among many competitors. It is a superb melon. Among muskmelons I think the Perfection unsurpassed. There are other good ones. Stame's Favorite is fine. Give ample space to all melons—12 and 16 feet for watermelons, 10 for muskmelons.—RUSTICUS, *Lexington, Ky.*

The Bloomless Apple.—Some months ago a farmer named Wm. Lagle, of Bradford, Ind., sent me a seedless apple. It was opened at the Farmers' Institute in this county and found seedless, but with a partly formed core. The grower writes that he bought two trees from an Ohio nursery agent, name and location unknown. One tree died, and the other has borne two years. He watched closely for bloom, but failed to find any, and so far not a seed has been found in any of the apples, although many have been opened. In size and appearance the fruit is about the same as the first one in the cut accompanying Mr. Bailey's article in January AMERICAN GARDEN.—J. P. APPLEGATE, *Indiana.*

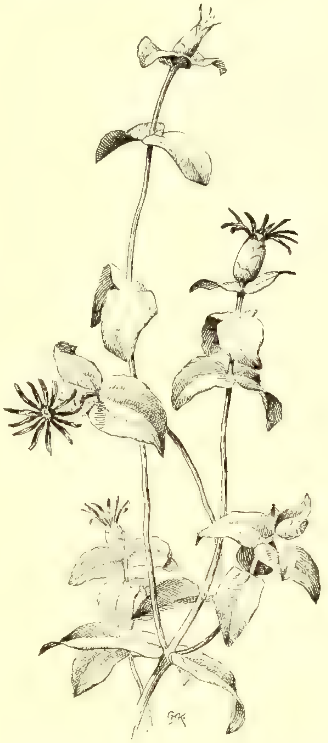
Fruit Prospects in Arkansas.—Le Conte pears are badly killed in Judsonia, in some localities the entire crop. Some of the late, shy-bearing varieties of peaches are badly damaged, but early and medium are all right yet. The Wild Goose plum is very slightly damaged, but the Chickasaw has suffered to some extent. The berry crop, which is the most important to us, is all right, though a great many growers think differently. The Wilson has suffered some, the Sharpless also; but of late years these have not been grown for the main crop, and consequently will cut no figure in the aggregate. The Crescent and Michel's Early are in fine condition, and with favorable weather until fruiting season will yield abundant crops. The latter is a new early variety which originated here, and in my opinion will supplant all the old leading varieties, it being at least ten days earlier than the Crescent and of much better flavor ; it is a perfect bloomer and will yield more fruit if the season is dry, as it roots deeper and the drouth does not effect it so much. It has been blooming some, but on close examination I find new crowns on all plants that have bloomed. The Hoffman Seedling is in good condition and is highly prized here, being quite early and one of the best shippers I have ever found. But it is not as good a bearer nor so well flavored as the Michel. Blackberries, raspberries and grapes are in fine condition and the prospects are good for an enormous crop, as the canes are extremely large and the wood thoroughly ripened.—*L. M. Pyles, in Fruit Growers' Journal.*

Too Much Thinning of Apple Trees.—Many pruners of trees err exceedingly by cutting away all the small branches in the middle of the tree-top. It is a common practice to see long branches, ten to sixteen feet in length, thoroughly denuded of every twig and fruit-spur. This is bad practice. The vital action of the tree rebels against such a practice by sending out numerous shoots and fruit-spurs on all the exposed portions of such bare limbs. The center of a tree top should be well filled with small branches bearing fruit-spurs.—Ess E. Tee.

Spray for Apple-Scab.—Professor Goff finds carbonate of copper the best material to check the apple scab. The formula is an ounce of carbonate of copper dissolved in a quart of ammonia and diluted 100 times with water. Spraying the trees with this solution practically prevented the scab. Fruit produced on trees thus sprayed was so free from scab that 75 per cent. of it was marketable, while that on trees not sprayed gave but a small proportion of marketable fruit. The spraying should commence about the time the blossoms fall, and be repeated once in two weeks until six or seven applications have been made. To do this properly would not cost more than 15 cents per tree, to spray both for scab and the codling moth, both mixtures, the above and London purple, being applied at once.

McMahan's White Apple.—The *Prairie Farmer* says that the apple that attracted the most attention, among the multitude of fine varieties at the late horticultural convention in Madison, Wis., was McMahan's White. Mr. A. L. Hatch, of Richland Co., Wis., raised 300 bushels of this variety last year, and pronounces it the most profitable of apples, in the long run. During the late series of severe winters he has not lost a single tree by severity of weather. It is said to be of Wisconsin origin, a lady having brought the seed from Ohio and planted it in Richland county. How it come to be named McMahan's White we did not learn. Mr. Hatch introduced the apple, and has disseminated it somewhat. The apple list of the American Pomological Society for 1889, double-stars it for Wisconsin and Iowa. The apple is described as large, round-obovate, color yellowish-white, quality good, flavor pleasant sub-acid, flesh white and very tender.

Zinnia tenuiflora.—A remarkably pretty variety of the zinnia family, and deserves recognition in every garden. The flower-heads are on long cylindrical peduncles ; stems erect. Dwarf in habit, a good grower, requiring only ordinary culture, and peculiarly desirable as a border plant. Sown where they are tc bloom with other dwarf varieties, the effect is harmonious and beautiful. The dwarf species are a decided improvement over the old straggling varieties, and tenuiflora is one of the best. With this variety and dwarf white asters, a combination double border may be formed which will outrival many of the more expensive greenhouse plants, both in beauty and brightness of coloring. For earlier effects, the seed may be sown earlier under glass and transplanted to the open ground.—G. R. K.



The Oonshiu Orange is receiving extravagant praise just now. On the 11th of last November the steamship Gaelic brought a large consignment of these oranges from Japan, and nurserymen have taken advantage of the advertising which this shipment has given to spread the wonders of the fruit and the tree. The Oonshiu is undoubtedly a very fine orange, but it is not the best, neither is it new to the country. Mr. Van Deman, National Pomologist, says that it is the same as the Satsuma, which was introduced into Florida as long ago as 1876.

Dewberries should be mulched with straw or some coarse and clean litter, in order to keep the berries off the ground.

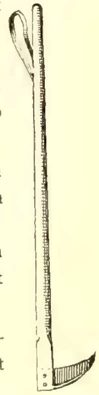
Young Grape Vines, those set last year, should be cut back to three or four buds. This makes the root stronger than the top, and gives vigorous shoots for the formation of the main arms.

Taste for Fine Fruit is increasing in proportion as education and culture increase In some places it even now pays to grow fruits for their intrinsic merits, rather than for their appearance. But in general neither the consumer or the grower knows what high quality is. Beauty, mellowness, juiciness; these are the attributes which usually sell the tree fruits.

All Pruning should be completed during April, if not before. The energies of spring and summer should be directed to tilling. Remove all the old canes of raspberries and blackberries, and thin out the new canes of currants and gooseberries to about a half dozen

Resolve to Keep the Insects and Diseases in check this year; then resolve to keep the resolution. The best surety that you will keep it is the securing of a good outfit for the purpose; insecticides, fungicides, and one or two good pumps. The outfit need not be expensive, and it will pay.

A Handy Cane-Cutter.—The sketch shows a very handy tool for cutting out the dead canes from thorny berry bushes, etc. It is made from the point of an old cradle scythe united to a hard-wood handle about three feet long, with a leather loop tacked on six inches from the end. In using it, the hand is passed through the loop and around the hand.



The Brigdon Peach is highly valued in some of the fruit growing sections of Western New York. It originated near Auburn, N. Y., and was introduced a few years ago from Smith's nursery, Geneva. Its friends rate it even higher than the Crawford.

If Obstacles Overcome you this year, apply to the experiment stations for aid. But try to overcome the obstacle first.

Save Some of that Manure for the orchards. They need it.

The Rough Bark on old fruit trees is not designed as a protection. Nature is always endeavoring to throw it off, not to retain it. On the other hand, its removal brings little direct benefit. The lodgements of a few insects may be destroyed if it is taken off, but the greatest benefit derived is the publication of the fact that the owner is tidy and thrifty. It is a significant fact that the best orchards have fewest rough trees.

The Old Apple Orchards.—"They are of no use," according to the verdict usually rendered as the axe is laid at the roots of the old time-honored trees. But is this really so? Why not help them to new life, new blood and a renewal of vigor not impossible to their old age? We can not afford to do without them after all, for often they will bear us fruit equal to, if not exceeding in merit the much talked of new varieties. But how?

In the first place, we want to break up the tough old sod about the roots and let in some of the blessed light and air so necessary to our own well-being. Then we want to give them plenty of enriching material—for they are well-nigh bloodless from long starvation—heaps and heaps of manure. You need not be afraid of over-doing that part of the treatment, for you can not if you try.

Trim out all old and decayed branches, and give them a neat and tidy appearance. It will be like a miracle when, in a season or two, the great rosy apples hang gloriously, or lie in heaps once more—a sight much talked of but not seen before by the youngsters of the family—while the rich flavor of the old-time fruit is again enjoyed by the older heads.

It is a pity that so many of our old orchards have been almost denuded of their tenants by the hasty conclusion of some over-zealous wielder of the axe, who hated the sight of the decaying trees which bore no fruit "worth picking up," yet were starving from the grossest neglect. Some rare old kinds have been completely exterminated by this means, and those of a later planting, equally poor as to fruit bearing qualities, are languishing under the same vile treatment, or rather from lack of any treatment. It is a grave mistake to allow an orchard to become an old sod pasture, destroying the trees to gain a small amount of pasturage or of hay it may afford. The ground must be frequently stirred about the roots to insure ample crops and good fruitage, while full manuring is indispensable.

It is from high culture alone that we can ever hope for large, perfect fruit and plenty of it. We must not be over hasty in condemning our old apple orchards, because of decay or non-productiveness, until we have thoroughly assisted nature in reproducing such fruit as our fathers and mothers used to eat under these self-same trees, or some like them.

It is a plea for the old orchards that I am making—a plea for the new life, new vigor, and new yield which a little care, some expense, and not a little good common sense would bring out of the patriarchs of old, left yet standing, but half condemned.—H. K., *Ohio*.

Good Intentions.—About nineteen out of every twenty persons owning or renting a place in the country, or in some country village, start out in early spring with a bundle of good intentions, which are to be applied vigorously on the little plot called the garden. These nineteen have resolved to have a garden wherein may be found vegetables of all kinds worthy the name; also borders of flowers that the passer-by may see that the owners of these gardens have souls as well as stomachs, ideas as well as appetites. In the end the twentieth man had the garden, the others did not; he used the active, they the neuter verb in their operations. It will not do to say, "I am to have a garden," but that "I *will* have a garden." What are the necessities of a good garden? Location is first, and that must be favorable; it must be open to full sunlight and fresh air. The soil must have in it the elements that enter into the desired vegetables; it must be dug deeply and thoroughly. In using the spade, go to the bottom of the soil, whether a few inches or a few feet, but no deeper. If hard pan underlies the soil, and the surface is a dead level, it must be drained, for, while plants cannot long subsist without water, they are moderate in their desires, and dread nothing so much as too much water.

Manure is the next requisite in order, and it must be applied liberally and intelligently. It must be in a condition for the plant to assimilate, as, in the garden, nature's methods are too slow. We want the plant-food prepared when it is put into the ground, so that the plant has nothing to do but to feed. The next step is to plant properly, not too much of any kind, or too thickly. Give each individual plant a chance to develop itself, and it will show its capabilities. And now comes an important part of gardening—choice of seed—and in this respect there is but one choice: ALWAYS GET THE BEST. This can always be obtained from reliable seedsmen, rarely from others. Poor seed will give poor vegetables, no matter what attention may be paid to the growth of the plants.

Work is the remaining element of success. The soil must be kept loose and free from weeds. It must be worked deep; then it will retain what moisture is necessary, and carry off the remainder. Go over the surface every morning with a fine rake, and there will be vegetables, and no weeds.—C. L. ALLEN.

The Cork Oak, Quercus Suber, has been planted, of recent years, in several of our states, with a view to the successful production of cork bark. Our country is now supplied with this important commodity solely from abroad. In southwestern Europe, where the cork oak is most abundant, the peasants make household utensils from the bark, and use it for lining the walls of their houses to prevent dampness.

The tree produces three layers of bark, the woody layer outside, then the layer of cork, and an inner layer next to the tree. When the tree is about fifteen years old the bark may be cut; this is done in mid-summer, by cutting two circles around the trunk, one near the branches, the other near the base, and connecting them by one or more perpendicular cuts. The bark is then readily removed. The first crop is rough and woody, and is generally used for tanning. Each succeeding crop is of better quality. The second crop is coarse, but of sufficiently good quality to be used for making corks. Crops attain their growth at from seven to ten years. When properly cared for these trees will produce bark until they attain the age of 150 years, and this will not be wondered at when the average longevity of the genus is considered. The inner bark, which is used for tanning, is not cut until the tree is destroyed, for if any part of it should be cut away, no cork bark will afterward grow upon the injured spot.—W. C. BUTLER.

Corozo, or Vegetable Ivory. This curious substance is the seed of the *Phytelephas macrocarpa*, a near relative of the palms. The fruit, which weighs several pounds, contains seven or eight seeds or nuts. The juice of these is at first clear, then milky and sweet, and finally it becomes hard enough to be worked on the lathe. The only known means of distinguishing it from ivory is the application of sulphuric acid, which has no effect upon the elephant's trunk but stains the vegetable counterfeit pink. The color, however, is very fugitive and is easily washed off. The plant grows in New Granada, in moist localities.—L. B. F.

Pruning Evergreens.—It is commonly thought that evergreen trees cannot be safely pruned to any great extent. Perhaps it is just as well that this idea so generally prevails, as it serves to rescue the beautiful natural form from the perils of individual caprice. As a rule, the evergreen is never so beautiful as when allowed to take its natural form, which, while not always symmetrical, is usually pleasing to the eye by reason of its conformity to its conditions and surroundings. This is especially the case where the trees are massed together. Then, if left to their natural growth, they will form a beautiful whole, although, considered separately, there may not be a single perfect specimen in the lot.

The evergreen should have a good leader, or central stem, if it is to stand as a single perfect specimen. This does not always come naturally. The leader sometimes leads off so rapidly that the side growth is lessened. This is particularly noticeable with the spruces. For a year or two there may be little if any side growth. Perhaps the next year or so after, the side growth will start out up near the top of the leader, leaving a bare space between. This gives the tree an unsightly form.

A little pruning at the proper time will prevent all this. If the leader at any time shows a disinclination to throw out side growth, cut it back to where the side growth is desired. Two or more leaders may start from this cut. Allow only the most robust one of them to grow, and it will soon take the desired upward growth, with only a slight quirk at the point of its starting from the original stem. This clipping back is sure to induce side growth and keep the tree full at all points.

In the hedge, the evergreen must be pruned severely and frequently. Most varieties will stand this treatment. The growth, as in all plant life, being mainly upward, it is the top shoots which must receive the most attention. It is a mistake to allow the hedge row to reach the proper height before commencing this cutting back. If this is done, there will be the same bare spaces that we have referred to in the single specimens. To guard against this, and to get a thick growth from the very ground up, the top growth must be clipped back from the very start. Do not be afraid that you will not afterward be able to get it up to the proper height. No matter how much it is cut back and discouraged, the tendency of the growth being always upward, it will soon regain lost ground if allowed.—W. D. BOYNTON.

Vegetables in Pennsylvania.—It is cause for congratulation that the farmers are devoting greater attention to the vegetable garden. Certain vegetables are being grown for general use, which a few years ago were only to be found in the market garden. The season was fairly favorable, although too wet for some things. Late cabbage, turnips, ruta-bagas and celery, which run far into the season, were quite productive, and seemed to thrive all the better for the continuous rains. The season of peas was also prolonged, and a second crop was gathered in the fall. The crop of early potatoes was good. There was also a large yield of late potatoes, but the crop rotted badly, especially in eastern Pennsylvania. The quality was also impaired. Tomatoes were slow in ripening, and the wet weather caused them to burst their skins and decay. The canning industry is growing, and new establishments in the southeastern counties packed a large output of tomatoes, green corn, peas, string beans, asparagus and other vegetables.—*From report of Fruit Committee of Pennsylvania Horticultural Association.*

Do not be in a hurry to get tender plants out of doors. Tomatoes, egg-plants, squashes, Lima beans should be put out only after the weather is thoroughly settled and warm. Nothing is gained by haste in these plants.

Honey Dew.—A very peculiar phenomenon has been observed in the woods in this vicinity. It is a deposit of sweet shining secretion on the leaves of certain trees and entirely absent upon others. It is supposed to fall from the pines, which always abound where this "dew" is found. The secretion, or dew, is conspicuous on the leaves of the holly or ivy, and the pine leaves also glitter with it when the sunlight falls upon them. The holly leaves look as if they had been immersed in alum water, but it is also singular that trees of the same varieties can be found growing close together, one of which is covered with the deposit and the other seems to have escaped entirely. The very open winter has encouraged the depredations of an insect upon the holly leaves, which present the appearance of having been riddled with shot. It is in every way a most unusual season, and while the vegetation on the high land is very forward, the river marshes, which generally show the first growth of grass in the early spring, have scarcely began to show any green tint. The alder bloomed in January and was killed, and now the peach trees are in full blossom.—P. S. HUNTER, *Essex Co., Va.*

[NOTE.—Honey dew is a secretion from aphides, or plant-lice. These insects are provided with two horn-like appendages near their posterior extremity, and from them the sweet secretion is made. This secretion attracts ants and other insects, and it is supposed to serve as food to newly-born lice. Ants often "milk" the lice by stroking the nectaries with their antennæ.—ED. AM. G.]

Shittim Wood.—It is reported that botanists who examined the rare trees growing near Nashville, Tenn., have decided that they are the "shittim wood of which Noah's ark was constructed." From the popular description given of them, they are closely identified with the *Acacia seyal*, which grows in the deserts of Arabia, and is common about Mt. Sinai, and is commonly accepted as the shittim wood of which Moses made furniture for the Tabernacle. Noah made the ark of gopher wood, which some think means cypress, but in all probability it is a general term for such trees as contain resinous inflammable matter. The immense size and character of the ark favors the probability that more than one certain species was used in its construction.—W. C. BUTLER, *Philadelphia.*

Keeping Up a Succession.—With a number of vegetables grown in the garden or truck patch, it is quite an item to keep up a supply during the greater part of the growing season. This can be done by making repeated plantings, or still better, by a little care in the selection of the varieties. With quite a number of these that it is desirable to keep in supply, there are early, medium and late varieties, and by planting them a succession can be kept up with less trouble than to attempt to make a number of separate plantings.

Beets, radishes, lettuce, peas, beans, sweet corn, cabbage, cucumbers, carrots and melons can, by a careful selection of varieties, be made to furnish a supply with a much less number of plantings than when the whole dependence is placed upon one variety. Turnip-rooted, French-breakfast and any of the larger long kinds, like Chartier radishes, can be sown at the same time, and by the time the first is used, the second will come in. Sweet corn and the other kinds can be managed in the same way. It is always an item to save time and labor, even in the garden; and while it is an easy matter to plant too large a number of varieties, I have found it profitable to use varieties to a considerable extent to keep up a supply and avoid making repeated plantings.—N. J. SHEPHERD, *Missouri.*

Note and Comment.—Those Back-Yards.—We have them in the country too, friend Stansbury, and what shall we do with them? We may possibly, by persistent effort, get rid of the old wagon-wheels, plow-points, barrels and such things, but how shall we eliminate the wood-pile, and turn the barren desert of the chip-yard into a "thing of beauty?" Perhaps we must concede this much to utility, I was going to say, but Victor Hugo's saying that "the beautiful is as useful as the useful, perhaps more so," came to mind. Let us at least insist that the area shall be small, and that order shall prevail there, and find comfort in the thought that if it continues an eye-sore there but few will think of it. For the rest, let the turf be as bright at the back as at the front of the house. Where the burdocks now thrive so well, perhaps caladiums will prosper. Let us clothe the wood-house with the useful hop and grape, and sow some morning-glories to climb among them and add their radiant beauty to the greenness. Let Virginia Creeper hang its fringes from the porch. Plant the clothes-line posts firmly, and let each support a grape-vine. Set a tree or two for shade near by if it be on the north side of the house; farther off if on the sunny side. Chrysanthemums may have a place there if not too shaded, and hardy roses make the waste to "bud and blossom." Then give these growing things, so close at hand, the dish-water and washing-suds, with which you were wont to invite a fever to your door, and see how they will thrive. Don't throw the ashes from the wood-fires into a pile to waste and be unsightly; go a little farther off and feed them to the pear and apple trees. And will some one please tell us the *best* disposition to make of the coal ashes? Will a thick coat of them under the plum trees really prevent the curculio from coming forth, while doing no damage to the trees, but rather benefitting them?

Long rows and horse cultivation are all right in the garden for most things, if the man will make the drills as for the corn, and do the cultivating when needed; but if the woman is to tend the garden with a hoe and rake, she may prefer to plant closer, and hoe vegetables instead of going over so much ground to destroy weeds. But don't take our garden to the cornfield half a mile away. Keep it near the house—we shall have far enough then to walk to get our dinner vegetables together. Many times it might be more convenient, if not so pretty, if each variety could be planted in squares, just as different varieties of fruits would be most conveniently planted in the same way in market orchards.

Women in Horticulture.—Certainly, they could engage in that business just as appropriately as in any other. Indeed it would be much better to do so than to engage in making shirts at 75 cents a dozen while finding their own thread; but there is one embarrassment that many would find it very hard to overcome—the lack of capital to get a start.

Do you find *Oxalis Deppei* as pretty as the picture? I did not; there was a narrow, dark bar, not very conspicuous, instead of a large colored spot on the leaflets.

Do you raise a few shallots for early onions?

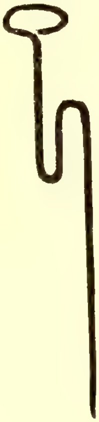
Has any one cultivated the wild dicentra, the "Squirrel Corn," of beach and maple wood? If not, why not? Is it not one of our loveliest northern wild flowers?—MRS. M. R. A. C., *Ann Arbor, Mich.*

Cato, who died 150 B. C. was a practical farmer. The truck farmers, of Long Island, are, in a measure, following his teachings: He said, "Study to have a great dung-heap. Carefully preserve your dung. When you carry it out, make clean work of it; break it up fine; carry it out during the autumn."

A Cheap Border of Flowers can be had by planting ten cents' worth of seeds of the good, old-fashioned Four O'clock. Sow them a foot apart in a drill, and the ten cents' worth will be sufficient for a row 400 feet long. They will make plants two feet high, and the row will be as compact as a hedge, and in early morning and evening as handsome a display as it is possible to make. In cloudy mornings the flowers will keep open until noon, rivaling in beauty a collection of the choicest azaleas. No two plants will be alike, and on the same plant there will be a great diversity of color.

The New Tea-Polyantha Rose, "Clothilde Soupert."—I have seen but few roses that commend themselves so highly, or which I would so gladly introduce to all who dwell with the rose, as the subject of this notice. Having frequently read its praises in horticultural papers and florists' catalogues, I have been more than anxious to see it, because the descriptions of our business florists do not always materialize—the plant, from some reason or other does not produce as fine flowers in the garden as the artist does in the catalogue. But "Clothilde Soupert" is on the table before me, watching what I have to say. She, like all other beautiful creatures, is fond of praise; but, unlike many others, she wants only what truly belongs to her—a just appreciation of her beauty and generosity. This she shall have at my hands, for a more pleasing rose I have not seen. This would not be true if I were to speak of its individual flowers, because I would much prefer a Jacqueminot, Pearl of the Garden, or American Beauty, but I should prefer a *plant* of this to any of the above, or to all three of them, for that matter, because on my plant—which is but ten inches high—there are now three fully opened roses, just two inches in diameter, a clear rose pink in the centre, the outer petals a pearly white, with a pleasant fragrance. The plant is of excellent habit, a free-grower, and, is moreover, like the polyantha class, a constant bloomer, admirably adapted to pot culture or for the open border.—C. L. ALLEN.

"A Mighty Handy Thing."—This is the opinion of the few who have used the "wire peg" shown in the illustration. It is an English invention, whether patented or not we cannot say, and is sold there for about 25 cents a hundred. It is made of heavy galvanized wire, but could be made of telegraph wire or even a lighter kind for smaller plants. It is far superior to the wooden peg used for layering, and not much if any more, costly. The lighter grades of galvanized iron would answer admirably for pegging down young roses for winter. In heavier work, like layering grape vines, a heavier grade of wire would be necessary.



Questions from the United States Department of Agriculture, Division of Pomology, *Washington, D. C., March 14th, 1890.*—I wish, through the columns of the GARDEN, to ask the following questions of your horticultural readers: Who knows of new varieties of fruits having been the result of "bud variation?" Have such new varieties been the result of accident, or was it known that such buds had varied upon the parent tree, and the buds been taken with the hope of reproducing the variation? How many, and what varieties of what fruits have been so produced, and what were the conditions and circumstances attending their production? Have certain whole limbs upon fruit trees (and not artificially inserted), been known to produce fruit entirely different from that borne by the rest of the tree? I shalll be much pleased if the above brings out a large number of replies; provided that they contain facts, and not guesses.—C. L. HOPKINS, *Washington, D. C.*

A Group of Rhododendrons.—We have none too many broad-leaved evergreen shrubs that will flourish well in our hot and dry summers, and this is the finest of them all. If it did not cost so much for the plants they would be in every garden in the cooler parts of the country; they are so showy in flower and the foliage is so rich through all the year. In England, where this native American shrub is used in immense quantities, they do not generally use all named sorts in making a plantation of this evergreen, but use *R. ponticum*, a rapid growing and cheap sort for the bulk of the mass, with a smaller number of the higher colored and costlier sorts around the edges. We can not use *R. ponticum* as it is quite tender here, but we can use our own *R. catawbiense* for the same purpose, and this sort can be bought for half the cost of named kinds. In making a bed of these superb plants of, say 100, use 75 *R. catawbiense* hybrid seedlings and 25 named sorts.

A few of the best named kinds are, hardiness and color being the desired qualities: Album Elegans, Roseum Elegans, Everestianum, Grandiflorum.

A neat low evergreen plant to form an edging about such groups is *Empetrum nigrum*, or "Crow Berry," one of our hardiest native plants. It forms a close carpet of fine leaves, which are of a very dark green color. *Daphne Cneorum* and the Callima, or heath are also used for this purpose, and all three form charming finishing touches to a good bed of rhododendrons.—F. L. Temple, *Cambridge, Mass.*

Cannas.—Get some seeds of the new dwarf varieties, soak them in boiling water over night, sow singly in small pots as soon as convenient and grow as rapidly as possible, and they will flower the first season. This advice is not for the owner of a greenhouse, but for every one who has a window for plants. The little pots will not require much room, and the plants will make the garden or border a mass of beauty. And while growing the dwarf cannas, do not neglect the tall ones, equally beautiful and more majestic.

Single Dahlias.—Yes, single dahlias surpass by far the double forms, and grow splendidly when treated as annuals. Get a paper of choice seeds, sow in the hot-bed or in pots, plant out when warm weather has come to stay, and a more varied or beautiful flower border than will be produced cannot be imagined.

Gaillardia picta var. Lorenziana has had its day as a novelty, and is now on the list of necessities among hardy annuals. If the seed is sown early in pots in the house, or in a hot-bed, the plants will come into flower in June, and increase in beauty until cold weather cuts short their existence. A light frost does not discourage them in the least; it only stimulates them to greater effort in the way of producing flowers, that, by the way, make charming bouquets.

Amaryllis from Seed.—The growing of amaryllis from seed is a very interesting and profitable branch of floriculture. Save seeds from the best varieties and sow them as soon as ripe, in pots, pans or shallow boxes filled with very light sandy soil, mixed with very fine, well-rotted manure. As soon as the plants have made three leaves, prick them out into thumb-pots, filled with a little heavier soil—a good lively loam—and grow them in a moderate temperature, shifting them into pots a size larger as required. They will, when well-grown, flower the second year. We have just seen a magnificent plant in flower, the seed of which was sown but two years ago, a cross between Bayard and Mon. Souchet. This seedling is in possession of Julius Scharff, of Floral Park, L. I., who not only grew it, but also cross-fertilized the parents. The flower is of good shape and intensely crimson in color, with slight traces of green, which shows the aulica blood. The amaryllis will rarely, if ever, produce seeds unless it is artifically fertilized, and if cross-fertilization can be effected the results will be more pleasing.

Thinning Out Plants.—Many of our readers are actively engaged in gardening operations. To such we would say that there is no more important work than the thinning out of plants in the seed-bed, from which they are to be transplanted, or in permanent beds in the garden. This work is often seriously neglected, or too long deferred. The proper time is as soon as the plants are fairly up. Then the work can be done without injury to those that remain. When the plants first show themselves, they have no fibrous roots; consequently when they are removed, they do not disturb the soil about those that remain. But if the work is deferred until the root is a bunch of fibers, their removal breaks off many from the other plants, besides loosening the ground about the young plants remaining so that they wilt down and get a check from which they do not recover. Many a crop of beets, carrots, parsnips and turnips has been materially injured, if not ruined, in this way. "Fingered" carrots and coarse-rooted beets are, in the main, caused by deferring thinning too long. Many gardeners leave the young beets until they are large enough for "greens" before thinning. This is all wrong. Beets fit for table use can be obtained two weeks earlier if the surplus plants are pulled out as soon as they appear. If greens are wanted, seed should be sown expressly for that purpose.

Does Market Gardening Pay?—With some men it does; with others it does not. The man who has a taste for the business; who strives to master all its details and obstacles; who has the proper soil, a good market and is honest in his dealings, and who has plenty of brains, manure and gumption, even though he has but a small capital and a limited experience, is bound to make it pay. On the other hand, the man who depends wholly on his hired help to do the work and furnish the experience, and who plants more ground than he has manure for, or than he can take care of properly; who markets his produce in a slovenly manner from a rickety wagon that carries the spring mud until fall; whose measures are not up to the standard; who spends more time in patching up his old tomato crates and barrels than on the land; who will bet $10 on a horse trot, but would think it extravagance to invest $5 in an improved garden implement; who buys his seeds from the man who sells the cheapest and then blames the season if his crops are a failure, stays at the business as long as his capital lasts, growls at everybody and everything, and then cries that gardening doesn't pay.—John Jeannin, Jr., *Rensselaer Co., N. Y.*

Rose Seedlings and Cross Fertilization.—In the German *Rosen Zeitung*, Dr. Muller, who has engaged in the propagation of new seedling roses for the last six years, gives the following directions for hybridizing and seedling culture: Before the bud to be fertilized has opened, the petals and stamens are removed by means of pincers and a little hook or crochet needle. This operation must be performed with great care in order to avoid injuring the ovary and pistils. The leafless flower is then wrapped with a thin layer of wadding, which is held in place by twisting a few of the fibres together. This covering excludes insects, absorbs the sap which flows in some cases from the wounds, and affords a firm hold for the external protecting envelope, which consists of a strip of waxed paper rolled into a cone and fastened by a pin. The cone is made long enough to project a little below the wadding, and the lower edge is pinched or folded about the stem so that the flower is completely protected from the rain. Within this double covering the pistils keep fresh, even in the hottest weather, for a number of days, and the experimenter can wait confidently for the best time for fertilization.

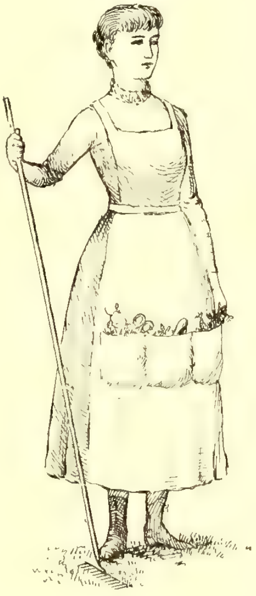
The stamens of a variety with which a cross is desired are collected in a saucer, which is covered with a pane of glass and shielded from direct sunlight. The anthers soon open and shed the pollen, which retains its vitality for several days.

The best time for fertilization is within a couple of hours before, or after, noon, on a bright fair day. With some varieties the selection of the proper time is very important; others may be operated upon in less favorable weather with success. The pollen is applied to the stamens with a fine, soft brush.*

The propagation of roses from seed obtained by crossing or otherwise, presents no special difficulties. The seed of the rose, like all seeds provided with hard shells, demands a certain time of preparation, during which it must be kept dry and cool. Attempts to force sprouting by heat and moisture are sure to result in few and sickly plants. It is well to free the soil of the seed pots from insects and other injurious elements by roasting it in an iron kettle until all offensive odor ceases, and drying it under cover. The seeds are sown in November, in pots filled with this earth. The seeds are covered with about three-quarters of an inch of earth, well pressed down, and the pots are sunk to their edge in the bed of a coldframe and straw laid over the sashes.

The seeds should germinate in the latter part of March. Shortly before this the straw covering should be removed. The sashes are still left as a protection against possible frosts, but should be raised whenever the temperature in the frame rises above 60° Fahrenheit. Seeds that have not sprouted by the end of April are dug up on a fair day and laid out on a board to dry. In a little while the outer shell springs apart and can be easily removed. The seeds are then replaced in the pots and generally sprout within two weeks. These assisted seedlings frequently overtake the others in growth. Seeds of the tea roses most frequently need assistance. With good soil and care the seedlings grow so vigorously that they can be budded upon small plants of *Rosa canina* during the first summer.—I. B. F.

A Gardening Apron.—I find an apron made of ticking very useful in the conservatory. It keeps the dress from being wet and soiled. A row of pockets at the bottom are very useful, also two above. I move the little pots from place to place in them, and keep my scissors, trowel, string hammer, tacks, bits of leather, etc., in my pockets, and it saves much running. I can find all these things handy when on a step-ladder tying or pruning vines, and I gather the dead leaves and twigs and keep them in my apron. In the garden too, my apron is my best friend. If the ground is damp, I sit down on it to weed or transplant, and find it such a saving of time and temper to have all my tools where I can so easily get them. The apron can be made in a very fancy way, so as to be useful and ornamental together. Mine is embroidered with red worsted, but it may be plain, as seen in the illustration.—Sister Gracious.



Study Your Conditions.—Just as complete failure may come from want of adaptation to the existing conditions as from any other cause. A multitude of things need consideration in determining what shall be our line of work. Among them are climatic conditions kind of soil, lay of the land, soil and atmospheric drainage, nearness to market, ability to get help, manure, etc. A farmer far back from the railway may grow and evaporate raspberries, and successfully compete with one close to market, because the product when ready for market is valuable in proportion to its bulk, while in the production of heavy, cheap, or perishable products he is at a great disadvantage. There is a wonderful difference between going ten or fifteen miles to market or railway station with a load, say one and a half tons of potatoes worth $25, or the same weight of evaporated raspberries worth $600. Considering it worth $3 to make such a trip, we have twelve per cent. of the market value of the first product taken up for the cost of moving it from the farm, while in the latter case it is but one-half of one per cent. In marketing $1,000 worth of the two, this difference would amount to the considerable item, $115. To carry soft perishable fruits this distance would be almost sure to work serious injury unless the roads were exceptionally good, which is not likely to be the case in such situations.

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* Dr. Müller neglects to give any directions concerning the subsequent treatment of the fertilized flower.—Translator.

Many men are located near a small railway station, with excellent facilities for shipping, who cannot command sufficient help to grow concentrated crops, requiring a great amount of labor. It by no means follows that because someone he knows is making money growing strawberries, onions, or celery, he can do the same. Instead of fretting because he cannot grow acres of these, or trying to do so against such obstacles, let him devote himself to larger fruits and those things requiring more land and less labor, for in the production of these he is more favored than growers located on high-priced land near markets. Neither should he fight against the character and ability of his soil. The attempt to grow celery for market on dry upland would very likely prove as profitless as undertaking to win a trotting race with an English draft horse. If the home market is good, grow what it demands. Do not try to educate it to take something better which it does not want; such philanthropic efforts are little appreciated, and the result is not unlikely to be a depleted pocketbook. If there is no home market look well to the shipping facilities, and grow such products and varieties as will bear handling well, and meet the demands of the distant market. If there are certain things you must grow, and no others, go to a place where conditions are right; but better adapt the crops to the environments as they are.

There is no reason to fear an industry because others in the community are engaged in the same thing. The chances may be much better from the very fact. If a community gets a reputation for growing any product especially well, this fact is likely to attract buyers to the locality. There may be sharp competition between them, and much better markets and prices secured than for an isolated crop in some section where such is seldom or little grown. Moreover, the fact many are engaged in its culture is evidence that the locality is suited to its production.—FRED W. CARD.

Disappearance of Starch from Twigs in Spring.—On March 12th to 14th, 1889, a comparison was made of the amount of starch present in scions of 12 varieties of Russian apples and 3 varieties of Russian plums, which had been kept in a cool cellar, with the amount in scions of the same varieties cut directly from the trees. Cross sections were taken in nearly every case from the top, middle and base of each scion, and the amount of starch recorded from inspection in the percentage of a full supply. This, although a rough method of determination, would, it was believed, furnish, by a large number of observations, a sufficiently good estimate for the purpose of comparison.

It was found that the apple twigs had lost but little of their starch, the average amount present in the twigs from the cellar being represented by 76, and in those from the open air by 86. The plums had lost most of their starch, the amount in the twigs from the cellar being 5, and in those from the open air 20. In one variety, the Early Red, the twigs from the cellar had lost all but a trace of their starch.

From the above it will be seen that the twigs from the cellar were farther advanced in vegetation than those in the open air, though none of them yet showed any swelling of the buds. The scions from the cellar were somewhat shriveled. Under the same conditions the cellar twigs should have contained a little the most starch, for they were as a rule the most thrifty. It was found that up to a certain size, strong well-developed and well-ripened scions contained the most starch, and that most was deposited in those twigs and parts of twigs which had well developed buds.

On March 19th and 21st an examination was made of the roots of several trees and shrubs and the amount of starch found compared with that in the twigs of the same species. It was found in the cases examined that more starch was then present in the roots than in the twigs. The kinds were several poplars and willows, Russian cherries, white pine, and red cedar.—A. A. CROZIER, *Ann Arbor, Michigan.*

Injurious Insects in Washington.—Few injurious insects have yet arrived to make sorrowful the joyous days of our pomologists. I am informed, however, of some local outbreaks of the codlin moth, and some less injurious native insects, in the valley of the lower Columbia. It costs millions of dollars annually to fight insects in the Atlantic states. It will therefore be readily observed how important it is to this favored fruit region to keep out the insects, immediately destroying all sporadic outbreaks. Much of the future prosperity of the country depends upon this vigilance. At the very first session of the legislature laws should be passed with severe penalties for negligence in this department of state police. The advances of science will afford no higher results anywhere or in any department of human activities, than in the early and careful use of the various insects destroyers that have been devised.—D. S. MARVIN, *Tacoma, Wash.*

The National Land Grant.—Prof. Goode, in a paper read before the American Historical Association at its recent session in Washington, said he thought the Morrill bill of 1862, granting land to colleges for the purpose of stimulating agricultural schools and experiment stations, did more toward advancing science and scientific methods than any other legislative enactment has ever accomplished.

Horticultural Statistics.—The 11th census reports are to contain very full statistics relating to horticulture. Mortimer Whitehead is in charge of the agricultural matter of the census, and he has conferred from the first with the national pomologist, H. E. Van Deman, concerning the horticultural matter. It is gratifying to know that at last horticulture is recognized.

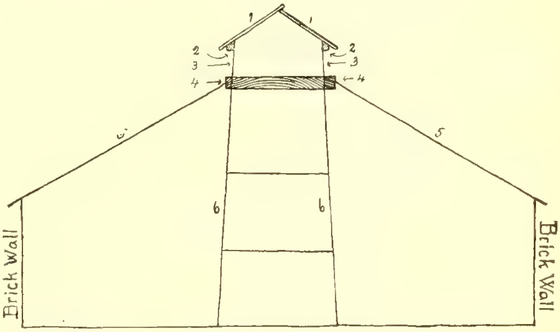
Death of Dr. Parry.—Dr. Charles C. Parry, for many years one of the most indefatigable botanical explorers of the west, died at his home in Davenport, Iowa, February 20th, from pneumonia following influenza. Dr. Parry was born in England in 1823. His first explorations were made in 1849, as one of David Dale Owen's survey of Wisconsin. The next year he joined the Mexican boundary survey, and from that time until his death his labors in exploration have been unceasing. He discovered hundreds of new species, and his name is indelibly associated with the botanical names of many plants.

A Good Transplanter.—A very cheap and good transplanter for removing plants from one place to another can be made as follows: Let the tin-smith take a sheet of "two-cross" tin 14x20, cut in two pieces lengthwise, making one piece 6¾ in., the other 7¼ in., both being 20 in. long. Pass through the rollers and turn them up like pieces of stove pipe. Then wire one end of each with good heavy wire. Solder the narrow piece with a good lap seam, and fasten a handle on each side of the wired end, similar to the handles of a milk pan. Then solder the other piece with a lap seam, just small enough to go into the piece with the handles, and slide easily. Then turn in the edge of it that is not wired ⅜ in. at right angles to the sides.

To use, take the outside cylinder, press it down in the place where you wish to remove the plant; give it a twist or turn to break the soil loose at the bottom, draw up the dirt and cylinder and shake out. Then put the cylinder together, and place over the plant to be removed. Press down the outside cylinder to the same depth as the other hole made; that will leave the inside cylinder resting on top of the ground, and above the outside cylinder. Then twist or turn the outside to break the soil at the bottom. Place the fingers in the handles, and the thumbs on top of inside cylinder, hold it to its place and draw up the outside cylinder; the inside cylinder prevents the soil from coming up with it. Remove your cylinder from the plant, and give the ground a slight watering.—S. B. Conover.

Tropical Plants for Summer Bedding.—The beautiful arrangements of coleus and other foliage plants are still popular everywhere; yet it is remarkable that so little is done towards varying such beauty. I saw, last season, our well known greenhouse plant, *Begonia odorata*, used in one large bed with a border of coleus around it. The effect was very beautiful. The locality was somewhat shaded and not over dry, which, no doubt, helped the plant to look so well. It flowers from spring till fall. Another very pretty plant that I hardly expected to do well in a mass for bedding, was the well known blue Achimenes. The effect was extremely pretty. A larger number of the plants of warmer regions would do for summer bedding with us than are now employed, if people would only think of trying them. In these parts the common banana is used to great advantage in summer bedding. Being dwarfer than *Musa Ensete*, it comes in well when the latter would be out of place.—T. M., *Pa.*

A Novel Greenhouse.—I have just completed a greenhouse unlike anything I have ever seen and I submit a drawing of a cross-section. The side walls are built of brick, 4 feet high. The ends are solid brick clear to the roof. Upright frames (6) run through the center, 7 feet apart; girters or stringers (4, 2) are nailed to the framing and connect them from end to end of the house, one at the top of framing (6), the other 6 inches below, leaving an opening (3) for ventilation. The ventilator is opened and closed similar to a railroad couch ventilator. On the side walls is a wood plate 2 inches thick, to which the rafter is nailed. The rafter (5) reaches to the lowest stringer (4). The rafters are 12¼ inches apart at the bottom or foot of each rafter. A piece of sheet zinc as wide as the rafter is thick is tacked in the center and turned back to form a loop to hold the glass from slipping; 10 x 12 double strength A glass is used. These are laid on top of the rafter after painting, leaving ¼ inch between the glass. This space is filled with putty and an oval strip ¼ inch thick is screwed down over the glass, the screws passing down through the putty into the rafter. The panes are placed edge to edge and are not lapped.—W. H. Capell, *Tennessee.*



Insect Remedy for Slugs and Snails. — Turn over stones, old boards, etc., and capture all the "sow bugs" you can; let them "go as they please" in the hot-house and cold frames and they will devour everything of the nature of slugs and snails, and some kinds of fungous growth. They will do no injury to any of the plants. Snails, etc., do great damage to lettuce, ferns and the young growth of many things, and growers have use for this remedy.—L. Stevens, *Rhode Island*

Some Cookery Crinkles.—Various winter vegetables with cream or milk dressing form a very agreeable addition to the cold-weather bill-of-fare. Cabbage prepared in the following way resembles cauliflower in flavor. A small, firm head should be selected and sliced thin; boil in salted water until tender and then drain. When free from water, put it again into the sauce-pan with a pint of sweet milk and let it remain over the fire until the milk almost boils. Remove the cabbage and thicken the milk with one tablespoonful of flour; add a tablespoonful of butter and serve as sauce. Turnips sliced into a bowl, covered with milk and nicely seasoned and baked for two hours, are an acceptable innovation. Onions steamed and then covered with seasoned cream are delicious. Parsnips will be found very nice if boiled until tender in salted water, carefully drained and then covered with sweet cream

CONFERENCE CORNER.

Tropæolum Speciosum.—"*Subscriber.*"—This sort requires a moist and shady position, in a peat border and must not be disturbed at the roots. We have never raised it; can any of our readers tell us how it can best be succeeded with in this country?

Coal Ashes—Novelties.—*U. S. W.*—Coal ashes are of little value in the garden in any condition. We have no reason to believe but that you will receive what you order from the firm you name, but you must make due allowance for the rather strong description.

Roses for Winter Forcing.—*C. T. D.*—We would hesitate to select so small a number as four varieties, and question the advisability of growing so limited a number. Among those classed as "teas," which have a steady sale in the large markets, are the following, named in the order of the price quoted for them (March 15) in the New York markets: Bride, Mermet, Hoste, Cusin, Bennett, Perle, Niphetos, Sunset. The La France, known as a hybrid tea, should be grown. Among hybrid perpetuals, those bringing the highest prices are Jacqueminot and American Beauty.

White Grub in Aster Beds.—*P. B. J.*—If the insect in your aster bed is the white grub of the strawberry bed, and it is quite likely, the best plan would be for you to change the location of the beds and occupy the ground with some hoed crop, as is recommended with strawberry plants; that is, if you want to get rid of the grub and care to have the land occupied.

Caring for Cemetery Plots.—*H. W.*—You can tell what it would be worth to care for a cemetery lot for a season better than we, supposing you figure your labor at its value, as well as the plants and loam in the same way. Among hardy plants, roses, hydrangeas and other lawn shrubs, various vines, such as *Ampelopsis Veitchii* and *quinquefolia*, and in fact almost anything the owner desires. Among tender and herbaceous plants, anything may be used that is desired.

Paper Berry Baskets.—*L. D. W.*—We consider the paper berry baskets most desirable, and they will usually help sell the berries. After all, their general adoption will be slow until consumers are willing to pay the cost of the box in addition to the price paid for the fruit.

Roses for Canada.—*H. R. D.*—The class of roses known as hybrid perpetual would stand your climate with some winter protection. If you can give teas and hybrid teas the protection of a "pit" in winter, you will be well pleased with the class. 2.—If planted in rows, set three feet apart each way for close pruning, and four feet for ordinary culture; prune in early spring, cutting off all decayed and dead branches and enough of the live wood to make the bush good of form. 3.—For bouquet green during summer, use geranium leaves, fern, vinca, *Asparagus tenuissimus*, feverfew, and with roses use the rose leaves. 4.—We see no advantage on your soil in using land-plaster in connection with guano and nitrate of soda.

Cosmos.—*Helen H.*—Cosmos can be made to flower before frost, if treated in the following manner: Grow the plants in four-inch pots until they are pot-bound; then they will show buds, when they may be turned out into the open border, and they will come into flower in August and continue in bloom until cold weather sets in. But why grow cosmos when the single dahlia can be grown with half the trouble and is far more beautiful?

A Sensible Query.—"Why grow rare and costly flowers—rare because they rarely flower—when the garden can be filled with beautiful subjects all the time at a moderate cost?" Why give a dollar for a plant that will bear only half a dozen flowers in a season, when the same dollar will buy seeds sufficient to plant an acre, and the acre will be carpeted with far more beautiful flowers the entire summer? Why not look with as much delight upon the bountiful gifts that all can enjoy as upon those that can be seen only by the few, because of their cost? Why not value a plant in proportion to the flowers it yields, as we value a tree because of the fruit it bears rather than because of its barrenness? Let us grow pansies and nasturtiums rather than plants that are too selfish to bloom or shed perfume.—C. L. A.

Chrysanthemums.—*C. M. B.*—You can grow hardy chrysanthemums with a good amount of satisfaction, and the Japanese or Chinese varieties as well; but you must do your part well. The soil for the plants must be kept stirred and be well fed. Cut them back the first week in July, so that they will branch out, which will cause them to flower more freely. Always commence in spring with a single shoot; separate the old stools to single eyes. Upon the approach of frost, have some frames covered with oiled paper, to be put over and around the plants for protection. These can be removed during the day, or a hot-bed sash can be put over-head, to remain until the flowers are done, and then the paper-covered frames put round the sides will give you flowers in abundance. By means of these appliances the chrysanthemums were grown that took the first premiums for a number of years at the New York Horticultural Society's exhibitions.

Passifloras.—*C. M. B.*—No; none of the passifloras are hardy. *P. cærulea* is rated as half hardy, but we do not think it could endure your climate, even with protection. But get *P. Pfordti*, a magnificent climber that will flower all summer, and it can be taken up and kept in the house during winter. It is an evergreen, and easily managed.

Banksia Roses are greenhouse plants, and cannot be induced to flower elsewhere satisfactorily.

Books.—*Same.*—The information you need has not yet been published in a single book; the facts are scattered through many, and should be collected and put in shape to meet the demand for just such information—how to get the mostflo wers from a city lot.

The American Garden.

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A NEW SCIENCE.

THE orchard, the vegetable garden and the ornamental garden are old institutions, and many of the practices and traditions of them are nearly everywhere familiar. Collectively they constitute horticulture, and horticulture, like agriculture, is known as the oldest of arts. But horticulture is an art which rests immediately upon a science, and singularly enough, this science is to this day almost wholly unrecognized as one separate and peculiar. Science in its direct application to agriculture in general is among the latest forms of knowledge and practice, and its application to horticulture in particular is almost the latest of the latest. If it is strange that such is the case, there is nevertheless a reason for it. This science is largely a knowledge of plants; yet botany, of right the science of plants, has fixed for itself a wholly conventional boundary, and has not reached the garden. It pursues the study of plants whose parts and habits are normal, or natural, as some would say, which have never been modified by the agency of man. Botany has been repelled by the garden fence, and has failed to reap its own best fruits. The difficulties of studies in the garden have discouraged botanists. "Roses have ceased to be a botanical study," our most eminent botanist once said to the writer. There is also a feeling among botanists that cultivated plants are scarcely worth the trouble of study. "How can you be a horticulturist? How can you love the garden?" a botanist of note once enquired of me. So the scientific study of garden plants has been neglected largely because the science to which it belongs has not claimed it.

It needs no argument to convince the reader that cultivated plants form an inestimable part of the possessions of the race. Darwin declared that "one new variety raised by man will be a more important and interesting subject for study than one more species added to the infinitude of already recorded species." That this addition, origination, of new varieties has been almost wholly haphazard, is no excuse for its neglect. There is no chance in nature, and somehow, sometime, we shall find out how and why it is that a peach can give birth to a nectarine or a white flower can produce a red flower. Or, of truth, we must first determine why a peach can give birth to a peach, or a white flower can produce a white flower. In other words, we must determine why and how it is that plants possess heredity, and vary, and can be made to vary under culture. We must come to a practical understanding of the fact that pedigree means as much in plants as in animals.

We shall look for the operation of the same laws in the garden as in the fields and woods, with the addition of the modification and intensification wrought by artificial conditions. The horticulturist begins where the botanist leaves off: he steps beyond the action of purely natural forces into the larger inquiry of natural forces as modified by man. It was the study of domesticated plants and animals that led Darwin to discern Darwinism. He was first struck by great likenesses of species when in the Galapagos archipelago: "But it long remained to me an inexplicable problem how the necessary degree of modification could have been effected, and it would thus have remained forever had I not studied domestic productions, and thus acquired a just idea of the power of selection."

In essence, man's cultivation is the same as nature's. Cultivation means, chiefly, an increase in

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food supply for the plant. If the cultivator adds food in fertilizers, so does nature, and nature's practice is far the more perfect. If man gives the plant space in which to grow, so does nature by thinning out the weakest in the inevitable crowding of individuals, or again through the law of divergence of character, by virtue of which more plants of many kinds can be grown upon a given area than of one kind. If man tills, so does nature, by the annual mulch of herbage. If man prunes, so does nature, by training and trimming the stem of the sapling into the bole of the tree, and by suppressing ten buds to every one that grows. Cultivation is but an empiricism suggested by nature. "Man, therefore," says Darwin, "may be said to have been trying an experiment on a gigantic scale; and it is an experiment which nature during the long lapse of time has incessantly tried."

As man's efforts are intenser than nature's, so his labors have given more marked results; or, to speak precisely, nature has yielded to his efforts. Animals and plants have varied so widely from their aboriginal ancestors, in many cases, as to be unrecognizable as individuals of the same species; and yet there is every reason to believe that variation of far greater extent and importance is possible. In plants, the study of all this variation under culture belongs to no science and has no name. Botany does not claim it. Agriculture, in its restricted sense, has taken to itself the study of soils and fertilizers and domesticated animals. It comes more closely within the knowledge and practice of horticulture than elsewhere, and it may therefore very properly be called the Science of Horticulture. When Lindley wrote of the "theory of horticulture," some fifty years ago, he was disposed to refer most of this matter to "horticultural physiology." But systematic features are now fully as important as physiological, and we are inclined to designate this field of inquiry a science.

The literature of the art of horticulture is voluminous. Progress has been rapid of late years, and ample record has been made of every advancement. But in its scientific aspects, horticulture has a meagre literature. The science of horticulture may be said to have begun with the labors and writings of Thomas Andrew Knight, about the opening of the century. Knight was long the president and leading spirit of the Royal Horticultural Society of London. Various contemporaries worked in similar lines, and Dean Herbert made invaluable contributions to the knowledge of plant variation through his work in crossing and hybridizing the Amaryllid lilies. Early in the century, Joseph Hayward wrote a treatise upon the science of horticulture, and was, perhaps, the first to use and outline the term. There were few important contributions to horticultural science in the English language for many years; in fact, not until Darwin wrote "Variation of Animals and Plants under Domestication," and "Effects of Cross and Self Fertilization in the Vegetable Kingdom." Darwin never addressed his work to the horticulturist, but his was the first successful attempt to collate the scattered mass of observation of the variation of domestic plants in the one case, and to present accurate, extended and coördinated experiences of the results of cross-fertilization of vegetables in the other. Practical knowledge of the results of cross-fertilization may almost be said to date from the latter work. This knowledge has been extended and epitomized in Focke's "Die Pflanzen Mischlinge." Darwin's two works here cited may safely be counted the cap-stone of a century of progress in science of horticulture. In another branch of this science, a monumental work has recently appeared in De Candolle's "Origine des Plantes Cultivées." This book, with the discussions which it has aroused, gives us a compendium of the known ancestral forms of cultivated plants, and is highly suggestive of future progress.

This science of horticulture is many sided, and sometimes ill-defined. The better part of it may be expressed in the phrase, "Variation of plants under culture and selection." In many cases, the effects of the simplest operations of culture are not well understood. The mere accident of variation in soil may be found to modify plants, sometimes profoundly. Sandy soils tend to produce high colors and high flavors, in consequence of their greater warmth. Peaches are nearly always richer in color and flavor on such soils than on wetter and stronger soils, other things being equal. Squashes often show remarkable differences when grown upon different soils, and these differences can sometimes be perpetuated for a time by seeds. The writer has produced from the same parent squashes so dissimilar, through the simple agency of a change of soil in one season, that they might readily be taken for distinct varieties. Peas are known to vary in the same manner. The ends of a row of peas, sown of the same kind, last year gave the writer marked variations, due to differences in soil. Many well known varieties are less distinct than were the two extremes of this planting. Light soils also tend to shorten the period of growth. Upon such soils plants mature earlier, and are consequently hardier. This is one of the earliest lessons which the fruit-grower masters. It is not known if this character, attained from soil, is transmissible to offspring. Light soils tend to make most plants smaller. Pea growers characterize soils as "good" and "viney." Upon the latter sort the plants run to vine at the expense of fruit, and their offspring, for two or three generations, have the same tendency. Light soils decrease the tendency to vary. Of many plants, seedsmen secure best seeds from such soils. These seeds are more likely than others to "come true," to reproduce their parents closely. Upon heavy and rich soils varieties tend to "break," or to assume various forms; and this "breaking" is the inception of new varieties. Our general knowledge of the influences of soils upon plants, of which these illustrations are trifling examples, is wholly fragmentary.

Change of latitude often works great change in cultivated plants, and yet the change is so obscure as to lead good observers to declare that acclimatization does not exist. The most apparent effect of removal through degrees of latitude appears in the stature of the plant. Northward, plants are smaller, dwarfer than southward. Corn is a familiar example. In Canada and the Northern States the species is represented by the flint or "Yankee" corns, while in the Middle or Southern States the varieties are all dents. In Canada the average height of corn is six feet, against twelve feet in the Gulf states. Moreover, recent experiments show that flints become dents, and *vice versa*, in a few generations, through a simple change of latitude. As a rule, dwarf plants are relatively more productive than large ones, and as more plants can be grown upon a given area, it follows that they give greater total yields in field culture. But there must be a point beyond which dwarfing is unprofitable, as diminutive plants can produce little. In other words, there must be for each species a most profitable ratio of size of plant to quantity of fruit. Experiment can determine this ratio, and must then seek to produce it. In general, transfer in latitude seems to be the readiest means to accomplish this object. When the latitude of most profitable production is determined for each species, the plant can there be propagated for dissemination elsewhere. Variation in reference to latitude is apparent in many directions. Color, flavor, habit of plant, and even variability itself, all are modified in many ways through laws of latitude, altitude and climate which we cannot yet announce.

Plants respond in a wonderful manner to man's care through direct selection. "Like produces like" is to the gardener a law of circumstances and conditions. If the phrase were strictly true, we should expect no improvement in varieties. We should still know only the old Cherry tomato and the single white or pink petunia. When once a species begins to vary, is "broken," man's power over it is marvelous. In a score of ways it responds to his touch. Yet, strangely enough, there are few explicit laws known concerning plant breeding by simple selection. It is tolerably well known that the character of offspring is determined by the character of the parent as a whole, rather than by that of any individual part which we may desire to improve. Small tubers of potatoes from large or productive hills give larger yields than large tubers from small hills. An experimenter labored in vain for many years in the endeavor to improve the tomato by selecting seeds from best fruits, but when he began to select seeds from fruits of best plants success came rapidly. So it appears that even so simple a matter as "selecting the best" may result in poor practice.

Darwin's work on Fertilization in the Vegetable Kingdom suggests an attractive and profitable field of horticultural inquiry. His experiments refer particularly to the immediate effect of cross-fertilization upon the productiveness of the fertilized plants, and they first called attention to the great importance of crossing to the plant itself. But it is only a step from this labor to the larger one of producing new and distinct varieties through crossing and hybridization. Lindley wrote that "hybridizing is a game of chance played between man and plants." It has now become a tolerably successful practice, however, and is a subject of common discussion among the better cultivators. Notwithstanding this, and the elucidation of many recent experiments, Lindley's phrase is not yet outgrown. Even the best of operators assume no exact knowledge. We simply know that if a cross or hybridization is affected between varieties or species of given characters, the offspring will likely combine more or less of the features of both, in varying degrees. Many examples of remarkable results of cross-breeding are proof that there are great possibilities in it for the horticulturist. Common literature is full of the assumed achievements of the practice, yet, in fact, our vegetable and fruit plantations know remarkably few good crosses and hybrids. In ornamental plants instances are common, and among the orchids they are numerous and commercially important. Many suppose, and with reason, that all or nearly all plants are capable of great improvement through amalgamation. There is certainly more reason to hope for great results of cross-breeding among vegetables than among animals, for the reason that domesticated kinds are far more numerous.

It may be a surprise to many to learn that the world still possesses great numbers of wholly wild species of plants which give promise of yielding important edible parts if once brought under the hand of the cultivator. In fact, there is every reason to believe that more edible fruits and kitchen vegetables are still unknown to cultivation than are now grown by man. Dr. Masters declares that "there are more vegetables to be had for the search than are at present in use. The difficulty is rather in overcoming the prejudice against new edibles and in getting them cultivated, than in discovering them." There are only about 250 species of plants cultivated for food for man among civilized peoples, yet the United States possesses within its borders certainly 75 wild species worthy of cultivation and improvement. In truth, America has so many wild plants of economic promise, that it appears to be safe to say that if the cradle of the race had been rocked in the Mississippi valley, the world would now have been far richer than it is in edible plants. Already our own woods have given us great treasure. All our grapes of out-door culture, all our raspberries, blackberries, cranberries, best gooseberries, and possibly our strawberries, have been improved from wild plants of our woods and fields. A new race of plums and of currants, indigenous to our soil, are now gaining prominence. And the untried resources in the way of wild grapes, plums, cherries, whortleberries, currants, gooseberries, and other things, are numerous. It is certainly not a bold prophecy to say that another century will bring many species of fruits into common use of which we now know nothing. The last half century of progress in American horticulture is of itself sufficient warrant for such statement.

One of the best measures of the status of a science is to be found in its vocabulary. Judged by this measure, the science of horticulture is yet in first infancy. Its terms are for the most part vague and inadequate, and many important conceptions and operations, capable of expression in a substantive, must be conveyed in a bungling phrase. It is not to be supposed that this meagre vocabulary means that the laws of horticulture are past finding out, or that ability is lacking to discern them. It only illustrates the fact, patent in so many directions, that the best talent has been given to agricultural professions less freely than to others.

L. H. Bailey.

FLOWER COMPOSITION AND DECORATION.

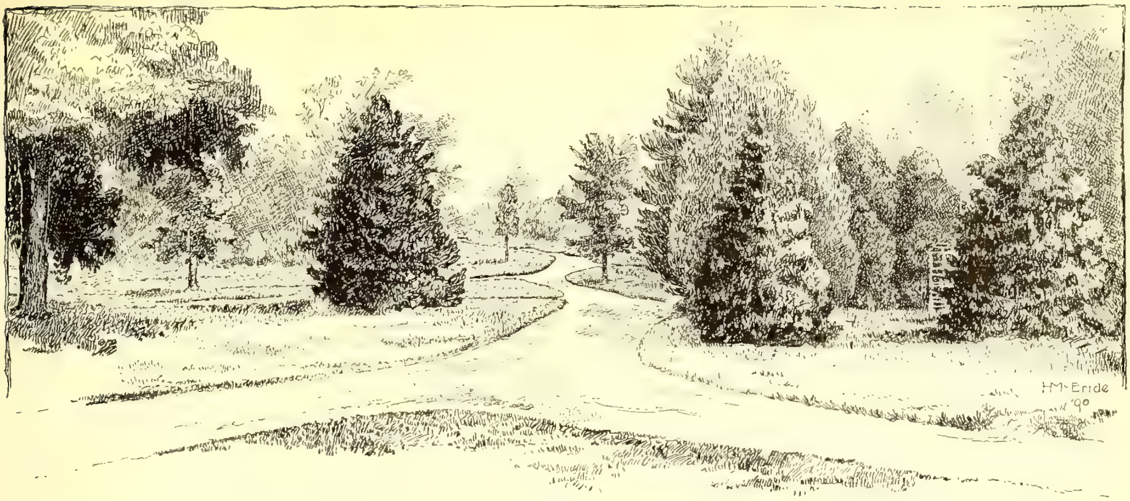
In a charming article by a writer in *Figaro*, the Parisian flower shops are described in detail, and the lines we quote are full of suggestions for women. "Marvels of art, veritable little masterpieces in which they display the faultless good taste of a Parisian lady and the science of an accomplished artist in colors. I feel for these flower girls the respectful admiration with which I regard all true artists, for they are quite on the level with our best painters. The least skilful of these shop girls can compose for weddings, marvelous symphonies in white, such as Raphael might dream of. But it is not everyone who wishes that can become a skilful composer of bouquets; certain conditions are indispensable. This business must be followed exclusively, in consequence of the individual not being able to endure the idea of following any other."

Let women, in search of a living, think of these things. It is undoubtedly true that women, more than men, have intuitively an appreciation of graceful forms and accordant colors. They have shown that they can be successful painters and sculptors —that they can work well with dead stone or pigment. Equally well can they work with living forms of flowers.

All intelligent men who have wives and daughters know that the latter can arrange flowers better than themselves. Why women are not found in the shops of florists, I do not know; but I am sure that the florist who will employ them will find that the skill and taste they show will increase his sales. It is an occupation worthy of any cultured lady of taste and refinement, who needs it for a living. I feel sure that if such an one should open in any city, a place where the finest creations of her taste could be found, and from whence, with a corps of skilful workers, she could decorate apartments for dinners or other entertainments, she could not fail of success. It requires only courage; let her try it.

S. B. Parsons.

[Mr. Parsons is probably not aware that there are several floral establishments in large cities run by women with conspicuous success, both in an artistic and financial way, and that girls are largely employed for making up designs by some of our most prominent florists. It is a worthy occupation for women, not overdone, and they succeed in it.—Ed. Am. G.]



REASONS AND RULES FOR CURVED DRIVES.

The chief reason why drives and walks should be curved in all places which make any pretense of natural landscape, is because such drives increase variety; and variety here, as elsewhere, "is the spice of life." There are three leading reasons why a curved drive augments variety. 1. It presents different views from each part. 2. The drive is hidden from itself: one does not look ahead over a straight and monotonous roadway. 3. The curves augment variety, because they force upon the rider a constant change of direction and position.

I often meet persons who fail to recognize curved drives and walks as a part of a natural arrangement. One can only reply that drives and walks are at best almost entirely artificial, and the best we can do with them is to throw them into natural-like and varied forms. We simply treat an artificial object in a natural-like manner. Curves are universally present in nature. Rivers and creeks and ravines follow graceful curves. Even when they appear at sight to be straight, a casual observation brings out flowing and varied lines of margin and direction. Even cow-paths are not straight; and I have often remarked to students that the trails which they make across large lawns as short-cuts are always curved, and these curves are many times sufficiently pronounced to answer all the purposes of landscape gardening. I have often challenged a teamster to drive in a perfectly straight line across an open ten-acre field, without taking sight upon a fixed point. Not one has done it.

But it is not every curved drive which is attractive; in fact, I often think that more drives are spoiled by curves than by straightness. A straight drive always has the merit of directness and convenience, while the unusual curves and indirectness of a poorly conceived curved drive distract the attention and obscure any merits it may possess. A few simple and general rules may prove useful.

1. All curves should appear to be necessary or useful. This rule really determines the whole character of the drive. The rest are corollaries to it.

2. Avoid balanced curves—a cork-screw or snake-like motion.

3. The curves should be direct; their general trend in the direction of the object to which they lead. The drive should go where it appears to go.

4. The successive parts should be hidden from each other by tasteful plantings along the borders.

5. The branches of a drive should diverge strongly at their juncture, and they should usually be wholly or partially concealed from each other by plantings or other objects. If drives diverge, they appear to lead in nearly opposite directions, and therefore have the appearance of usefulness. If the parts have the same direction, one portion appears useless. A broader statement is the following:

6. No two drives, or parts of drives, should be parallel or appear to lead to the same object.

7. The nature of the curves should conform somewhat to the character of the landscape. In rough or bold grounds drives may have much bolder and more spirited curves than in tamer places.

The illustration is a good representation of a poor drive. The bare and indirect curves stand out painfully as one looks down the drive, and there is no apparent reason or excuse for the twistings. This illustration is made from a view in one of the best campuses in this country. But the picture illustrates another error often made in grounds which frequently change management. The abominable crooks in this instance are due to the "tacking on" of one drive to another, without consulting the genius of either one. L. H. B.

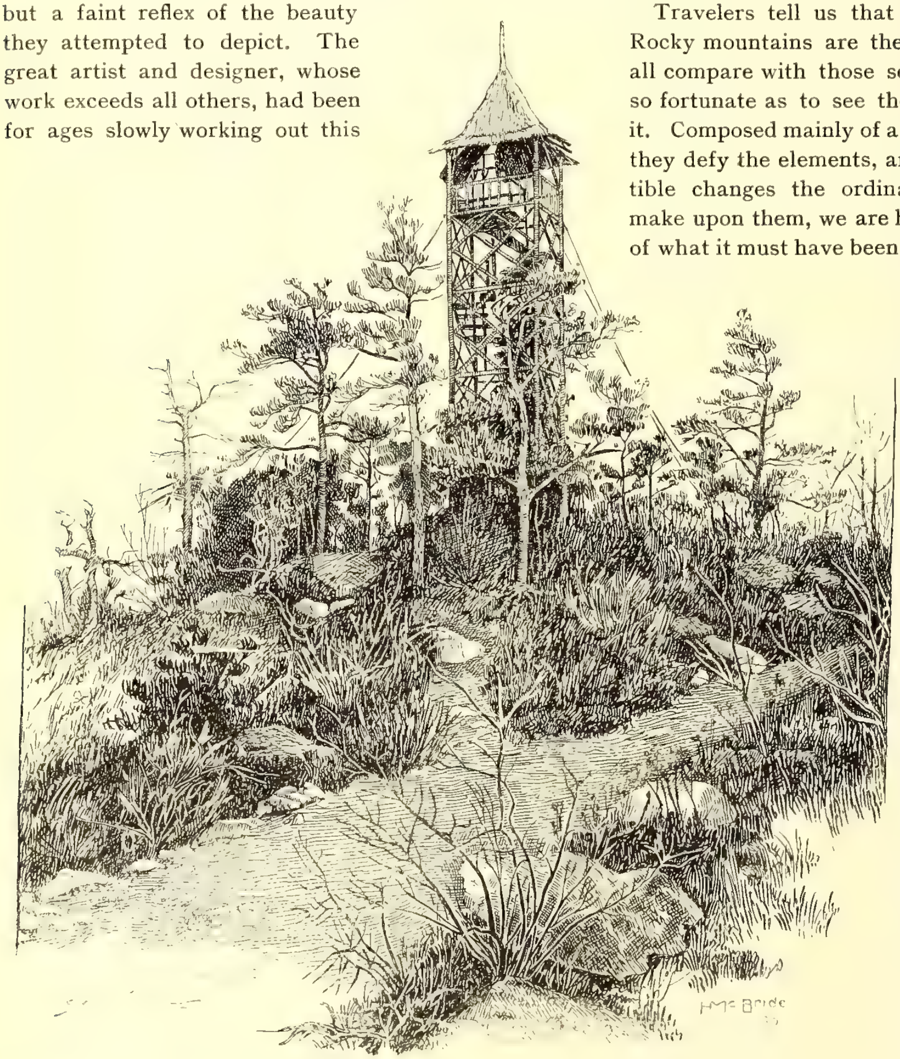
LAKE MOHONK AND VICINITY

AS SEEN BY A LANDSCAPE GARDENER.

THE PLACES in our country that are increasingly becoming known from their picturesque attractions are greater every year, and we hope soon to say greater in the number of those that are being preserved and cared for. Among those of which it can now be said, Lake Mohonk is conspicuous. For nearly half a century it has been visited by artists, whose admired pictures have been but a faint reflex of the beauty they attempted to depict. The great artist and designer, whose work exceeds all others, had been for ages slowly working out this perfect picture among the lofty hills of Ulster county, New York.

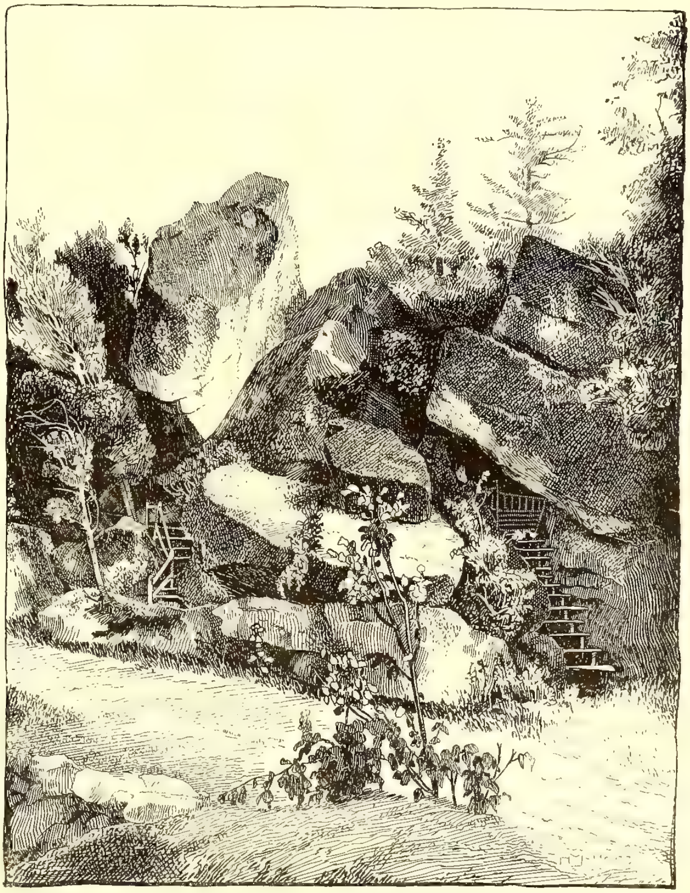
At some far and ancient period of time the top of the highest of the Shawangunk mountains, nearly two thousand feet high, was cleft in twain by the unknown forces of nature, and for half a mile this deep and wondrous basin became filled with water, now as clear and green as the ocean, and like it, even in its isolation, the home of many fish. This is Lake Mohonk, said to signify in the language of the Indian "On the great sky top."

Travelers tell us that nowhere east of the Rocky mountains are there rocks that will at all compare with those seen here, and no one so fortunate as to see these will ever question it. Composed mainly of a quartz conglomerate, they defy the elements, and from the imperceptible changes the ordinary forces of nature make upon them, we are helped to a realization of what it must have been when they were riven and sliced, or piled and tossed into the grand and inspiring positions we now enjoy, apparently with the ease of a wave rolling the pebbles on a seashore. Covered with black and dark brown lichens, whose upper surfaces become an olive green when soaked with rain or dew, they would be enough to absorb our attention were it not diverted by the tall pines and hemlocks springing from their bases, and even growing from their tops and sides with no soil to support them that our eyes can discover. What the Japanese practice as an art is here done by nature. In places where in-



The Tower on Guyot's Hill, Lake Mohonk

vestigation has proved there is no soil, a wind-driven seed from a pine tree has found an opening large enough to lodge. True to its hardy nature, in response only to the moisture of the rock and the sunshine of some long-past spring, it started into life, sending its first tiny green needles to rejoice in the sunshine and little tap root to cling to the rock it could not penetrate. Unable to flourish like its brothers in the neighboring forest, and rear aloft a massive head of evergreen branches upon a tall columnar trunk, it made the most of all its opportunities, and became in miniature a counterpart of its gigantic relatives around. Most of these have fallen by time, winds or the axes of man, but the sturdy dwarfs defy the fury of storms, present no attractions to lumbermen or wood-choppers, and their strongholds of rocks protect them from the all-destroying forest fires, to delight our eyes and perfume the rarified air with their delicate balsamic scent. Decades and perhaps centuries, botanists tell us, have been spent by these little trees in perfecting their pigmy growths, perfect in trunk and branches. He who would attempt their cultivation must live as long as did the patriarchs of old to enjoy the fruits of his skill, or be willing to plant for his children's grandchildren in their old age. Laurels and birches festoon the sides of the cliffs. Ferns and mosses carpet the shady depths of the deep fissures and rents among the enormous rocks. We can imagine when the laurels are in bloom that they present a scene unrivalled for pink and white beauty, with such a setting of rocky backgrounds and canopy of forest leaves and mountain skies. The alpine plants that abound are an all season's delight to the botanist, and furnish innumerable examples of good arrangement to those interested in rock gardens—suggestions without number. We may copy the effects, but our handiwork cannot attain what the hand of nature has been ages in accomplishing. Servile imitations will be so inferior as to invite failure, but we can adapt our materials as well as our limited resources will allow. One of the lessons to be learned here is how many natural materials may be employed in picturesque gardening other than the beds and walks and plants, that too many think are the bounds of the art. Take some of the walks, for instance. Perhaps we start off over a gravel walk or drive made as hard and compact as that about any residence, yet being near the hotel or on a much frequented line of travel the necessity is apparent, and they are not obtrusive even with their primeval surroundings. In fact, none exist without a reason for their existence, and in all the work here use is made of the materials near at hand, and they do not force themselves upon us in the unpleasant manner foreign matter would have done. Fortunately, good materials seem abundant, but the labor of conveying them where wanted in this mountainous region must be tried to be appreciated. Rocks were removed, mires filled in, and the whole covered with gravel or broken slate, which packs down and drains well, a feature especially desirable when there are heavy mountain rains soon followed by sunshine. If the roads are not perfect in all places, let us be glad of what has been done; and where else can upwards of thirty-five miles of private road be found upon any one estate, rough or level? Long drives have been constructed on both sides of the moun-



THE STAIRS AMONG THE ROCKS.

tains. Sometimes they wind along the cool top or high side of the mountain a thousand feet, or even half as much again, above the level of the earth, then plunge into the primitive forest, crossing brawling streams or following their banks, now curving along the slopes of green hills where cattle pasture, again passing cultivated fields or passing under beetling cliffs, where the grandest rocks are massed in an endless and ever-varying confusion. The walks are worthy of particular study. None of them are without an object. Filled with curves, they do not zigzag aimlessly. Perhaps we step from the pounded slate to take advantage of the smooth surface of some grand stone left by nature, finer and larger than the best in the pavements of the metropolis, smooth from glacial action as if done by the lapidary; or we may turn aside to avoid some huge boulder that fills the direct way, stopping to admire the quartz conglomerate that constitutes its substance or the mosses that clothe the damp and shady portions and the ferns that fringe its base. We may follow the path where it leads along a precipice, protected by railings for those who may be dizzy, or goes to some point where one of the ever-varying mountain views is to be enjoyed. Here we will doubtless find one of the many summer houses provided for rest and shelter. These are so numerous, unique and characteristic of the place that we must speak of them particularly again. Often a chasm between the rocks crosses the paths, but a firm rustic bridge delights us, and we enjoy a better sight of the fissure than if we toiled over the hot way leading down and around it. So numerous are these in one of the paths to "Sky Top," where the mountain is parted as if in gigantic slices, that we have an experience unequalled elsewhere. Not always do the paths lead overground, but in some places under it. The Great Crevice, 150 feet deep, is not only crossed by bridges, but has a path through it. The underground paths are more popular with the men than with the ladies, but few of either sex regret the trouble and exertion they demand, so grand and inspiring are they to those strong enough to take them. They are free from the desolation and depression so frequent among rocky scenes, but all rock-work seems puny after beholding this. The paths around the lake teach us that grand and distant views, perfect as they may be, are not essential to the most enjoyable walk. A wall of natural rock on one side and deep and placid sheet of water on the other seem no less perfect in their way. But we are so much indebted to the path that enables us to take it all in that we must not forget to observe how unobtrusively art enables us to enjoy nature at her and our best. Also can we by its aid enjoy the bracing air and unequalled view from "Sky Top" tower, see the rivers, towns, plains and mountains of six different states. The Berkshire hills of Massachusetts do not hide the dim and distant mountains of Vermont, and beyond the Neversink mountains are those of Pike county, Pa. Over the fertile valley of Duchess county the Connecticut hills appear, and looking across the counties of Orange and Ulster a portion of New Jersey can be seen.

JOHN DE WOLF.

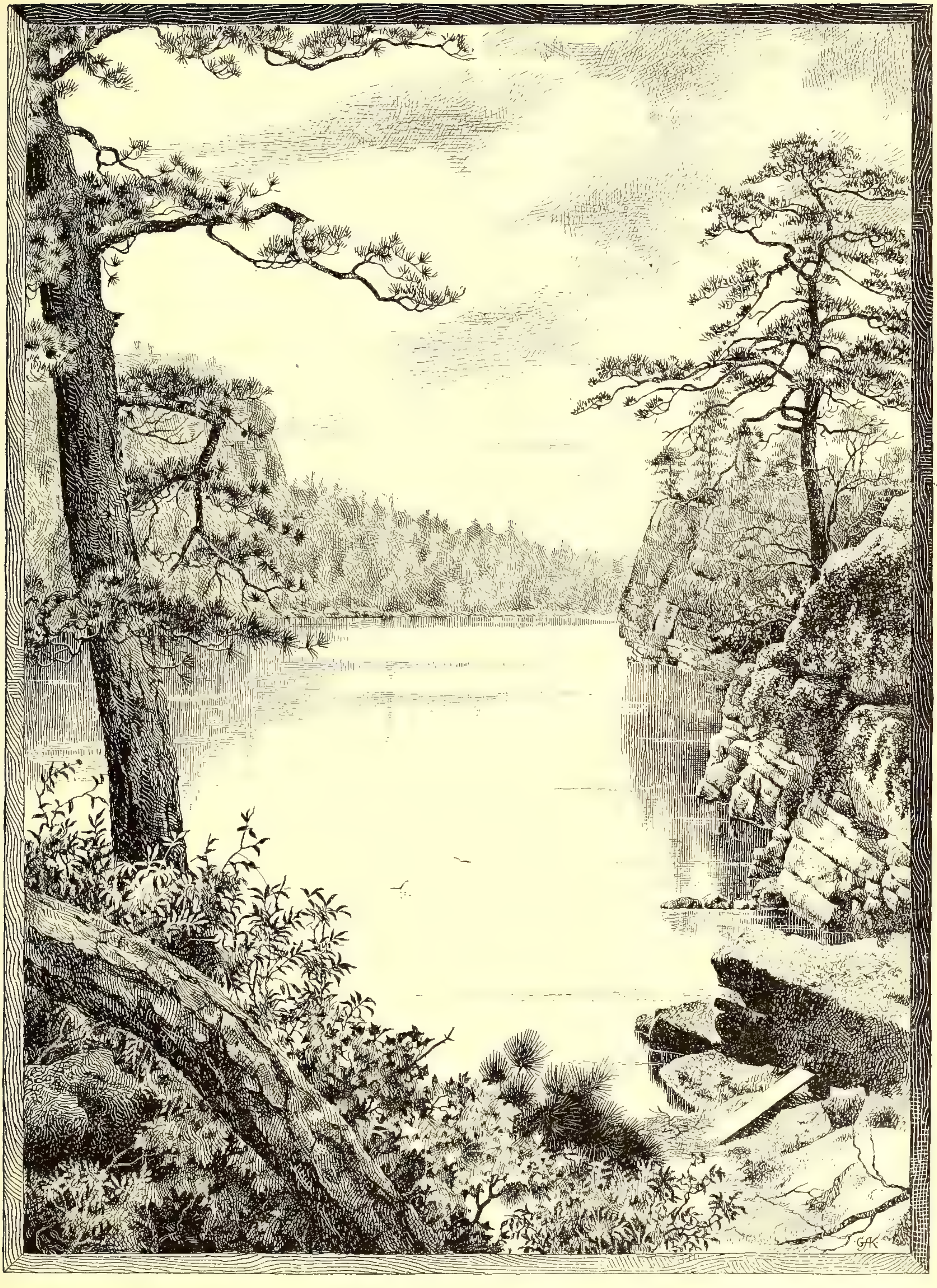
OUT-DOOR BOTANY.

A SUGGESTION FROM EXPERIENCE.

"The foolish man," says Emerson, "wonders at the unusual, the wise man at the usual;" while Lowell more wittily words the same truth: "We think lightly of nature's penny shows, and estimate what we see by the cost of the ticket."

With what dismay would the average hay-maker be likely to open his eyes at all that Mr. Ruskin finds to say about so insignificant objects as grass blossoms: "Minute, granular, feathery or downy seed vessels, mingling brown punctuation and dusty tremors of dancing grain with the bloom of the nearer fields; and casting softness of plumy mist along their surfaces far away; mysterious evermore, not only with dew of the morning, or mirage at noon, but with the shaking threads of fine arborescence, each a little belfry of grain-bells all a-chime!"

It is an ignorance incompatible with their information on other subjects that intelligent people often display in speaking of even common garden flowers. They use such terms as "I've seen some like *those* before;" "Mrs. M. has flowers like *that* one;" "This *white* one is sweeter than that *blue* kind;" or to point out trees by the roadside as "the *tallest*," or "*short one*," or "*giant*," in order to designate the object of their thought. That the most marked characteristic of a plant or tree has escaped their observation appears in their surprise when their attention is attracted to it by a more observant companion of nature. Having eyes, they



A View on Lake Mohonk.

seem to see not; having ears, they hear to little or no purpose.

No study is more attractive, nor more easily pursued than that of out-door botany—"out-door" here being used to distinguish its actual application to plant life from the mere in-door study of the text-book. If gardening is good for the physical needs of frail men and women, the intelligent acquaintanceship with vegetable structure, history and growth is good for distracted mental conditions. No high education is necessary upon which to begin it. Everyone is equipped to glean rich rewards from the simple pages of nature's book. Any child old enough to gather his hands full of golden dandelions is ready for a primary lesson.

A "Home Culture Society," composed of the ladies of a country neighborhood, in the early stages of its existence, chose botany as the special study for one season, with results so salient as to lead me to recommend it to others. A part of the members had taken botany in their school days, but the majority of them could not have told what a *cotyledon* means, much less had ever given a thought to the differing traits of plants bearing netted and parallel-veined leaves, or to the peculiar provisions of plants within themselves for self-protection and propagation. A new world, fresh, wholesome and vigorous, opened to their minds, overtaxed with the vexing endlessness of routine duties; and to their eyes fair objects took on unaccustomed interest.

"I never shall forget," says one member, "one stormy April day, in particular, when our club met. We came together fortnightly to compare notes, read papers prepared on topics, and give verbal outlines and reports on the work assigned in our text-book, which was Gray's School and Field Book of Botany. Our lesson was on buds, and the collection of bare twigs and wet branches we women brought together that day would have borne convincing testimony to the most astute opposer that we were both earnest and enthusiastic in something out of the line of topics commonly ascribed to congregating females. We confined our gossiping to a harmless verbal and actual dissection of the bud family. We discussed if they were terminal, axillary, accessory or adventitious, etc., much to our profit and nobody's hurt."

As the season advanced, telling its old, old story of the birth and growth of plant life, a freshening impetus came to the club through the successive unfoldings of germ to bud, bud to blossom, blossom to fruit; a quickened interest came to the eyes of those women for the things of voiceless life about them, a brighter glow grew on cheeks more exposed to out-door life, and a warmer sympathy each felt for the other members, while a new catechism of questions was put into the mouths of the younger members of the families represented by these home students. Never again can it be said of them:

> "In vain, through every changeful year,
> Did nature lead him (her) as before."

Michigan. JENNY BUELL.

A FEW WORTHY NATIVES.

Erythronium albidum, var. coloratum.—This little beauty is of recent introduction from Texas. It is a great bloomer and seems to be perfectly hardy here in New England. It is similar in growth to *E. albidum*, but the petals are pinkish white, while in albidum they are tinted with blue. It is much earlier than any of the eastern or California species with which I am acquainted. At present, March 15th, the flowers are showing above the frost and snow.

Anemone patens, var. Nuttalliana.—This is the American pasque flower, and is found in the western prairies in early spring. It closely resembles a minature clematis no more than six inches high; but the flowers are quite large, dull purple to nearly white, and when fully expanded, from 2 to 3 inches in diameter. It takes readily to cultivation in well drained soil in the open border, and seems to be perfectly hardy in New England. The leaves are rather large and deeply lobed.

Aquilegias.—Two species from the Rocky mountains are very fine. *Aquilegia cœrulea* has large white or blue-tinted flowers, and must have a warm well drained soil to produce the best blossoms, and be well protected in winter. *A. chrysantha* has large, golden-yellow flowers, with long spurs. It does not seem to be so particular about soil or situation as *A. cœrulea*, and increases in size and strength.

All New Englanders who like the fields or woods or mountains are acquainted with the wild columbine (*Aquilegia Canadensis*). It flowers from April to July, and is met with in our rambles in the moist meadows, the upland pastures and along the mountain cliffs. It seems to adopt itself to any situation in which it may be caught and find a bit of leaf-mould and moisture for nourishment. It may not be the most beautiful or showy flower, but for us it has a hidden charm.

Hampden Co., Mass. E. GILLETT.

TARRYTOWN LETTERS—VII.

TOOLS—WE HAVE TOO MUCH PEOPLE AND TOO FEW TOOLS.

BY A. B. TARRYER.

ALL of the wheel-hoe people, apparently, have got our range, and are showing their sympathy by firing circulars at us from all points of the compass. This is as it should be. But while the good work of weed destruction goes on with all the weapons the law allows us, Mrs. Tarryer wishes an irregular line of demarcation drawn between wheel-hoes and the elegant and deadly hand-weeders she prefers to patronize. She has a few wheel-hoes up garret that would be in use, no doubt, were our rig suitable for that running-gear. Had we a ten-acre lot sowed with onions, I might go down to Castle Garden and select some unfortunate foreign brother, with a mild aspect and an upper lip capable of stiffening, who wanted to learn our language at a cheap rate, and turn him into that lot with the wheel-hoes, and keep him going over and over those onions all summer. That broad field work is the function of the wheel-hoe. We should calculate to furnish a case of off-year, filler tobacco, the same that we put a little of into hens' nests (hoping it would not be accepted), and that his friction and trampling to and fro would keep the weeds down and have a tendency to crush fungii and scare insects. The rattle of the machine would tell when the man was sweating himself, and he wouldn't be disturbed in his studies (except during showery weather in haying) till he chose to graduate or the onions were fit to harvest.

The careful reader, several times over, of the preceding Tarrytown Letter, will have discovered that the above wheel-hoe system, though profitable and easy for the master, and tolerable, when he can't help himself, for the man who comes to this country without any letters of introduction or affiliations with our international secret societies, would not be social enough for Mrs. Tarryer. The onion-field aforesaid may be regarded as a state of probation—quarantine ground—and the wheel-hoe as a kind of out-doors treadmill, well calculated to test the quality of the Prince Hamlets of Denmark, who land on our shores incog., but not fit for the elect. Mrs. Tarryer would be sure to know of any distinguished merit being in her neighborhood in humble circumstances. In fact, I have just pictured, between my lines, the early career in this country of a fair-haired and blue-eyed Scandinavian—a descendant of old Snorro's Harold, perhaps—who was one of our first favorites some years ago, and is now, with one of her graduates, occupying a place of trust, where they will laugh long when they see this allusion to themselves.

Our sketch shows a young woman using one of Mrs. Tarryer's thrust-hoes in the strawberry garden; extirpating every weed; transplanting or planting or cutting off what runners she pleases without touching a finger to the soil; gently lifting and breaking, around the young plants as well as in the alleys, every particle of the crusted loam after a puddling rain, leaving it a crumbling, cooling mulch, fit to withstand midsummer heats or showers for one while, and without a footstep showing.* This is a very different thing from any wheel-hoe operation, planting purslane with every step as it goes. You would think the fairies had done it, or it had done itself, it seems so little laborious and so much the work of culture and grace.

Perhaps the engraver will not be able to show all the details. Some things may as well be left to the imagination of the student. Mrs. Tarryer looks over my shoulder and says that a "Mr. Kit" is to be understood facing this way, just the other side of "Miss Kitty," and that he hears every word she says, which could not be if they were rattling and jamming wheel-hoes into that baked earth and gravel.

Wheel-hoes won't work everywhere. What would those two young people do if they had a stiff row of raspberries, blackberries or currant bushes between them—what in a garden of roses with only wheel-hoes for the tangled tillage? As it is, with those erect, stand-at-ease implements, we may imagine them smiling the little-or-nothings at each other that mean so much in such cases, and carrying on more of the world's necessary business above than under the raspberry bushes, while weeding the latter most thoroughly.

Or suppose the case of a neighbor's fence next our garden, and he growing *Agropyrum repens* under it to run through our potatoes, what could we do with a wheel-hoe there in the latter part of the season? But one of those pointed hoes could be shoved under the neighbor's rails or pickets, and hoe half a row on his side of the fence easier than he could do it with a wheel-hoe. So among running cucumber, melon or squash-vines, where any other hoe would be ruinous, it is nothing but play, with one of those fourteen-inch blades, to go over all the spaces inclined to weediness, not only among the vines, but around a hundred other things in every well-appointed kitchen garden, that cannot be reached by any other hand or horse cultivation with one-tenth the speed, accuracy and power.

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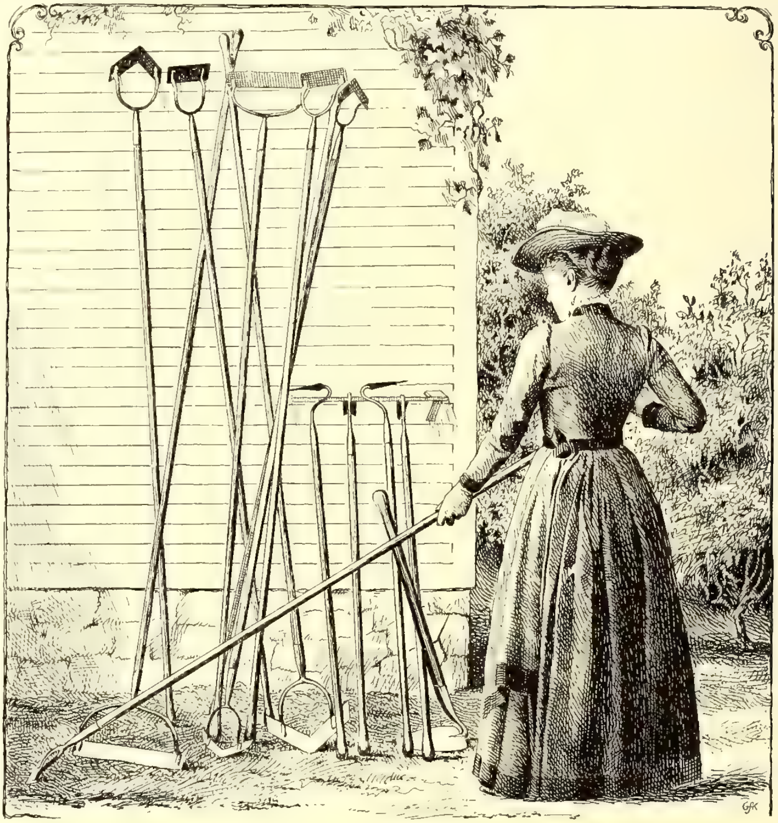
*[The sketch ought to have shown all this; but the artist gave up in despair of bringing out all the excellent points of Mr. Tarryer's description, partly for fear of offending Mrs. Tarryer, and so contents himself with trying to represent the soil in its hard and unhoed condition.—ED.]



One of Mrs. Tarryer's Girls with Her Hoes.

Scores of times during the season, the ten or fifteen minutes one has to enjoy in the flower, fruit and vegetable garden—and that would suffice for the needful weeding with the hoes we are celebrating—would be lost in harnessing horses or adjusting and oiling squeaky wheel-hoes, even if everybody had them.

The Garden is not big enough, nor my patience long enough, to give more than an inkling of the unspeakable merits of these weapons of society and civilization. When Mrs. Tarryer was showing twelve or fifteen acres of garden with never a weed to be seen, she valued her dozen or more of these light implements at five or ten dollars daily; whether they were in actual use or adorning the front hall, like a hunter's or angler's furniture, made no difference. But where are these millennial tools made and sold? Nowhere. They are as unknown as the Bible was in the dark ages, and we must give a few hints towards manufacturing them.

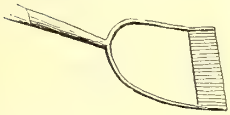
First, about the handles. The ordinary dealer or workman may say those knobs can be formed on any handles by winding them with leather; but just fancy a young maiden setting up her hoe meditatively and resting her hands and chin upon an old leather knob to reflect upon something that has been said to her in the garden, and we shall perceive that a knob by some other name would smell far sweeter. Moreover, trees grow large enough at the butt to furnish all the knobs we want—even for broom-sticks—though sawyers, turners, dealers and the public seem not to be aware of it. Yet it must be confessed we are so far gone in depravity that there will be trouble in getting those handles. The three or four hundred that were procured by C——s Co. (that was in Maj. W——d's time), the whole United States were scoured for. Mr. S——e, now president, travelled or wrote far and near, and the only available ash logs were "cut and hauled twelve miles over the mountain to the saw-mill," in Kentucky somewhere. This was a great engineering feat, but what man has done man may do. Timber and ideas have been growing since that time, and experiment-stations have been started in every state.

In a broadcast prayer of this public nature, absolute specifications would not be polite. Black walnut and butternut are fragrant as well beautiful timber. Cherry is stiff, heavy, durable, and like maple takes a slippery polish. For fine, light handles, that the palm will stick to, butt cuts of poplar or cottonwood cannot be excelled, yet straight-grained ash will bear more careless usage.

The handles of Mrs. Tarryer's hoes are never perfectly straight. All the bayonet class bend downward in use half an inch or more; all the thrust-hoe handles bend up in a regular curve (like a fiddle-bow turned over) two or three inches. Unless they are hung right, these hoes are very awkward things. When perfectly fit for one, they may not fit another—that is, a tall, keen-sighted person cannot use the hoe that is just fit for a very short one.

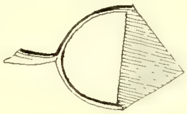
Until young people become aware of these eternal fitnesses they are not much good in the garden. Those curves in the handles throw centers of gravity where they belong. If a fresh weeder (during vacation, perhaps) pushes heedlessly ahead of his business, the expert young women on either side of him may simultaneously drop considerable pebbles from their deft hoe-blades into each pocket of his flannel jacket! Lack of ballast can be readily hinted in this way, when thrust-hoe handles are curved as aforesaid. Good timber generally warps in a handle about right, only implement-makers and babes in weeding may not know when it is made fast right side up in the hoe.

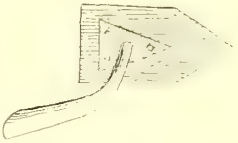
There are plenty of thrust-hoes in market, such as they are. Some have malleable iron sockets and bows—heavier to the buyer and cheaper to the dealer—instead of wrought-iron and steel, such as is required for true worth.



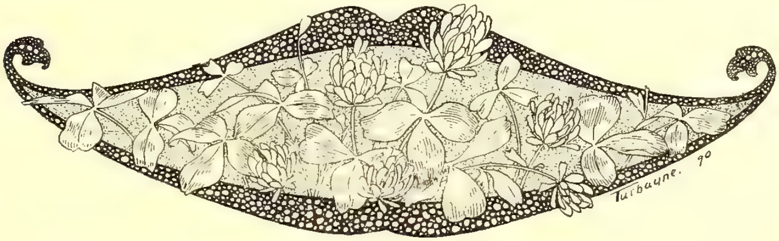
There is a clumsy, imported, fish-spear pattern, wrought or welded in one piece, which does fairly for trimming flower border turf edges. It has evidently fallen from grace in the hands of obfuscated mechanics and the trade that "sells" the buyer with its goods.

Mr. Loudon has a number of obsolete old emblems of the "Dutch" or "scuffle-hoe" that suggest better things for our Edens. Here are two relics which prove that the ancients understood the virtue of pointed steel in the garden. How many of Loudon's pictures have been patented in this country? But he don't seem to know that a broad blade produces more friction and will clog vexatiously with soil when it is sticky with dew or rain. The blades of Mrs. Tarryer's thrust-hoes—please take notice—are fastened to the small feet of their slim bows with loose rivets, like mower-knife sections, so that any one can readily replace a worn-out blade upon occasion, while favorite handles, sockets and bows will last, with care, for a lifetime.





Hidden in part by the lady's dress in the photograph, unless the engraver has seen to it, is an omnipotent digger which must not be overlooked. I don't see how women, or men either, can be thoroughly independent in the garden without it. For turf, or any hard, rooty digging or light grubbing, the cutting of bogs or the handling of tough clay or hard-pan, nothing in the world can compete with it. Put a malleable "D" handle on it, and we have a wonderful swing shovel, capable of tossing a hundred loads of stiff earth in a day easily. It is a man's hoe—one that any man strong enough to be gentle might be proud to know the use of, and worth more to a woman than a bad husband.



PEACH BUDS AND THEIR UNTIMELY "TAKING-OFF."

BEFORE the winter just closed was more than half through, it became evident that the season was to be a most exceptional one, and the peach as a sensitive fruit tree was selected as a subject for microscopic examination of the flower buds. On the third of January, twigs of the peach were obtained from a number of New Jersey growers. At that time, while there was some swelling manifest, no injury could be observed. From that date until the time of writing (March 19) fresh buds were inspected almost every week, especially following any cool spell, there being nothing that could be called real cold weather until near the middle of March. During the past week a large number of buds have been examined, some lots of which had no living buds, while others showed the rate of mortality not lower than seventy-four per cent.

The facts, well known to every peach-grower, are quickly stated. The winter was a warm, moist one, and the peach, being one of those trees easily stimulated into activity, began to push its flowers, and by the middle of January many blossoms had appeared. All such flowers it was natural to expect would prove fruitless, and the peach-growers' hopes were centered in those flower buds that did not more than swell, some of them only slightly. Up to the 10th of March the peach crop for New Jersey, for example, was not specially impaired. At that time, while some of the more forward trees in the warmly exposed situations, as hillsides sloping to the south, were not in the best condition, the owners of the orchards counted upon a fair crop, provided the weather would not change to that of an ordinary winter. At *a*, in Fig. 1, is seen a portion of a twig showing the condition of the buds at the coming of the "March freeze," which, in passing, it may be said, was far above zero for all parts of New Jersey. The figure was drawn from an average twig, and it represents three of the flower buds with their scales loosened one from the other. To the feeling such buds are soft, and in some cases, by looking down upon them, the rose color of the infolded petals is apparent, and occasionally a stamen shows its yellow anther. In order to bring out the swollen condition more strikingly, a portion of another twig, *b*, is placed by the side of *a*, on which the buds are of their normal size for the time of year at which I am writing.

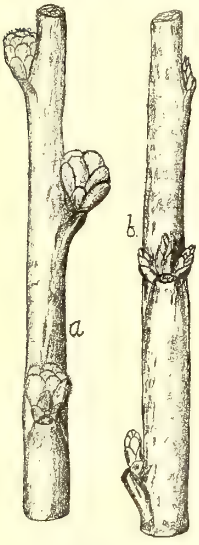


FIG. 1. PEACH BUDS.

The real condition of things within the bud scales is show to some advantage in Fig. 2. At *a*, the bud is represented as in a normal midwinter condition, while at *b* we have a thin longitudinal section through the half-opened bud. In the center of all sits the pistil or miniature peach, which is of the shape of an Indian club, the large basal portion finally maturing into the luscious fruit. There is no great change in the pistil between the two buds, the one in *b* being larger and better filled out. In *a*, the stamens are small and the anthers often suspended, the cup bearing them coming quite close up to the pistil. In *b*, the anthers are larger and upright, while the cup is expanded at the top into an inverted bell. The scales, also, instead of folding over the pistil are extended laterally, and have grown to double their former size.

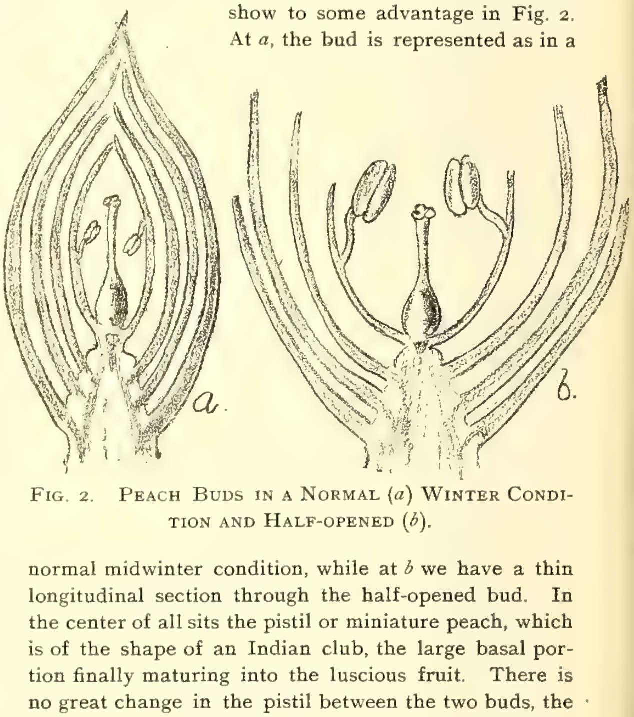


FIG. 2. PEACH BUDS IN A NORMAL (*a*) WINTER CONDITION AND HALF-OPENED (*b*).

Such are some of the more prominent structural differences between the closed and the open peach bud in winter. The fact that one bud is open and the other closed is not enough to account for the differences of behavior of the two towards a low temperature. It is natural to infer that the cold can get into one and not the other, and therefore the freedom of access is sufficient reason for frost killing. We need to look back of this visible difference to the condition of the vital portions of the bud. It is a well known fact that any living vegetable tissue that is in an inactive condition will bear extremes of heat or cold much better than one that is undergoing growth. A dry seed, for example, will not suffer under circumstances in which it would perish if filled with water, and a growing seedling may be still more susceptible. The whole design of a scaly winter-bud is to be quiet, and, as far as possible, avoid sudden changes of temperature. A well-prepared bud is in many respects like a mature seed, and becomes most subject to the influences of heat and cold only when it begins to unfold. The most delicate tissue is one that is growing or upon the eve of growth. The opening out of the peach bud scales helps to expose the tender parts within, but the cause of the opening of the scales is the one that has rendered the vital central parts vastly more tender than they were when in a hibernating condition.

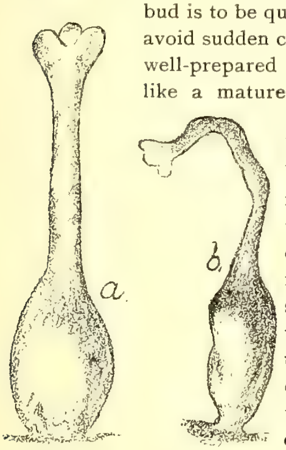


FIG. 3. PEACH AND PISTILS.

When a peach bud has been killed, the pistil is among the first parts to show the fatal effects. Instead of being green—the only green portion in the center of the flower—upright and plump, as illustrated at *a*, in Fig. 3, it turns brown, shrivels, and the slender part twists, as shown at *b*. Next outside of the pistil the stamens change in the same way, and later the crown or calyx to which the stamens are attached loses its healthy appearance and becomes of a dark brown. In short, all that part of a flower bud lying within the inner scales usually turns dark. In *b*, Fig. 3, for example, it is all of the flower that is attached to the tip of the short branch bearing the miniature peach, or all above a small obscure triangle that may be seen below the base of the pistil. The petals also turn to a dark color, but these are borne by the crown, and therefore come within the area described. On account of the scales retaining their color, it is not always easy to distinguish the dead bud from the outside for a long time after death. As the tender parts within when killed dry up to a powdery mass, especially the stamens, a pinch of the bud is often sufficient. However, the best test for the orchardist is to make a longitudinal cut through the center of the suspected bud, and if the central portion is dark nothing more need be hoped of such buds.

This has been a test winter in some respects, and it is hoped that every one will learn some valuable lesson from any loss sustained. If some varieties of peaches have come through better than others, make a note of the fact and be governed accordingly; it is by continuous selection that we shall attain hardiness.

BYRON D. HALSTED.

Rutgers College, New Jersey.

GRAPE DISEASES AND BORDEAUX MIXTURE.

It is gratifying to know that competent vineyardists are confirming the results of professional experimenters concerning the almost wonderful efficiency of Bordeaux mixture for some of the diseases of the vine. Many tests were made in commercial vineyards last year, and a number of good reports have been made of some of them. Mr. David Allerton, a painstaking Hudson River viticulturist, gave a valuable paper upon the subject before a Farmer's Institute held at Poughkeepsie late in February. The paper was the result of actual investigation. Its main points are given below.

The grape vines treated by me with the Bordeaux mixture comprised my whole vineyard, and as some varieties up to this year had been healthy, they were on that account not treated till mildew and rot had already showed itself, but even they show the good effects of the copper solution, as it controlled mildew and brown rot even after it started, preventing further infection. The vines first treated by me were 100 Duchess and 50 Delawares, and my experimental vineyard, containing some 80 varieties of grapes, all of which were treated five times. With two exceptions, all of the vines remained healthy in foliage and fruit, which ripened as perfectly as any grape vine could in such a cold, wet season. The two exceptions noted were the Centennial and Mammoth Pearl. On the 26th of June I noticed that these vines were badly mildewed, the clusters, leaves and young shoots being covered with powdery mildew to such an extent as to give them the appearance of being covered with flour. I also observed that on the Duchess and many other varieties, the spores of the black rot fungus were numerous on the foliage. I procured the Bordeaux mixture and applied it to these vines—the Duchess experimental vineyard, and 50 Delawares. The Centennial and Pearl were hopeless cases. The Delaware first treated did not lose a leaf and ripened every berry with good foliage and well ripened wood. I examined my Duchess and found, principally on vines that had had black rot the year previous, some black rot. I picked off the rotten berries and applied the Bordeaux mixture again and subsequently applied it at intervals of two weeks, picking all the rotten berries from the stem. I secured in all from the 100 vines about one quart, the fruit ripening in good order. The vines were healthy and held their foliage well.

About June 1st I noted the appearance of brown and black rot on those grapes comprising the bulk of my vineyards, Concords, Wordens and Pocklingtons, and mildew on the leaves of the Delawares, and mildew, brown and black rot on the Brightons, which last went so fast as to become a total loss. Wyoming Red and Champion were very slightly affected. Determining to do what I could so late in the season, I sent at once for an Eureka sprayer, realizing that although I might be too late to accomplish much this season the experience might be of benefit another year. I received the sprayer July 13th, which was about the time of the most severe visitation of rot. I immediately applied the mixture to all my vines in the most thorough manner, repeating it after an interval of one week. The rot on the Concord and Wordens was mainly brown rot, and some occasional vines were badly diseased with black rot. The effect on the brown rot was to stop it where it was, and those grapes not affected ripened. The increase of black rot was checked. The rot on the Pocklington was black rot, and one week after the last application I had the rotten berries picked from 500 vines. The vines were heavily loaded and would have required severe thinning had the rot not injured the vines. However, as it was, they yielded an average of 8 lbs. to a vine.

There was some subsequent rot, but not serious. The Delawares were lightly mildewed when the mixture was first applied, and it seemed to increase greatly, so that I despaired of saving the vines, but after the second application it was checked, and the third time I sprayed with a solution of carbonate of copper, recommended to me by Col. A. W. Pearson, of Vineland, N. J. As this solution did not show on the fruit, he regarded it as equal to the Bordeaux mixture. From the 900 Delaware vines I marketed 92½ per cent. of the actual grapes on the vines which were well ripened and colored.

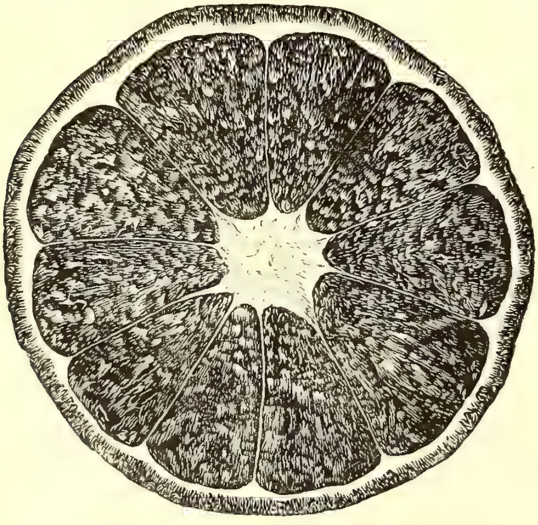
The machine I used was the Eureka sprayer, made by Adam Weaber, of Vineland, N. J. It is made throughout of copper, very strong and durable, and is carried on the back like a knapsack. Its capacity is six gallons, and it weighs 64 lbs. when filled. One filling will spray from 75 to 100 vines in full foliage on both sides. I easily sprayed 1,500 vines per day. The spraying tube of this sprayer beeng held low, the spray strikes the vine from beneath and on a level. It is much more effective than where a pump is used in a wagon, which application of the mixture is very unsatisfactory. My experience in the use of these copper solutions show that the spraying must be thorough to be effective. Where the mixture is thrown on with force and in a stream, as from a syringe or pump, it sticks to the clusters and will render them unsalable. Although spraying so late as the 26th of July, I had no trouble from this cause. Hereafter I shall use the carbonate of copper solution. The cost of spraying one acre, 4 times, counting labor at $1.50 per day, is with the Bordeaux $4.50 and with carbonate of copper $3.50.

H. S. C.

A JAPANESE SUCCESS.

AN ORANGE WHICH MAY BE HARDY IN DELAWARE.

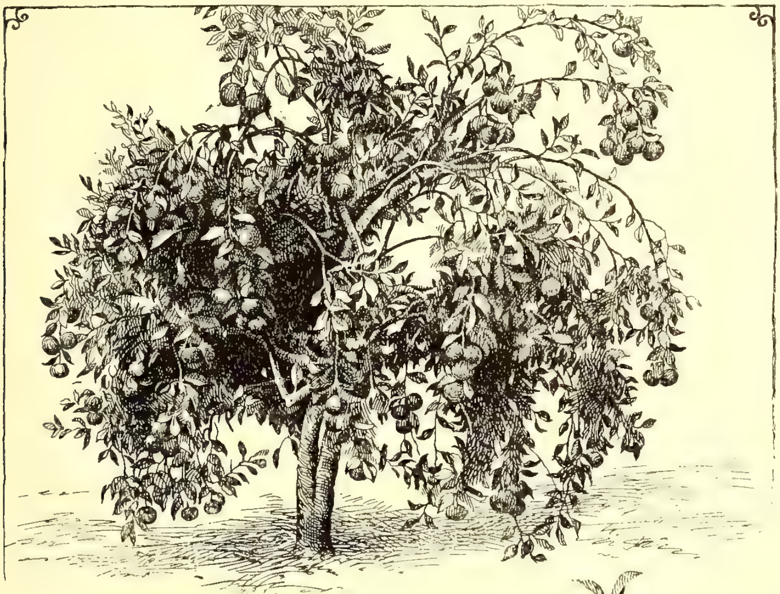
Not many years back, any orange was simply an orange, with but one main distinction of variety, given as to whether it came from Messina or from Havana. Then the Havana oranges, regardless of size, shape, color or quality, were the top notch, and supplied the desires of those wanting the best.


SATSUMA ORANGE, CROSS SECTION.

The opening of orange culture on a commercial scale in our own Florida has changed all this, and practically driven the foreign fruit out of the market, save as poor crops at home or especial cheapness give it entrance. And our orange lovers have learned to distinguish, even in the north, between the many varieties received from Florida, and frequently between the same variety grown in different localities in the flowery state.

The writer well remembers his first acquaintance with one very distinct orange, the Mandarin type, which, from an abundant crop, strayed into the interior Pennsylvania markets a few years ago. The peculiar flattened shape attracted the eye, and a closer examination established the little fruit firmly in the favor of many who then first obtained it. The varieties of the species to which all of this type belong (*Citrus Aurantium nobilis*) are many, and much superior to the original form which pleased us. All possess the peculiarity of a loose skin, readily removed without breaking the skin of the interior segments.

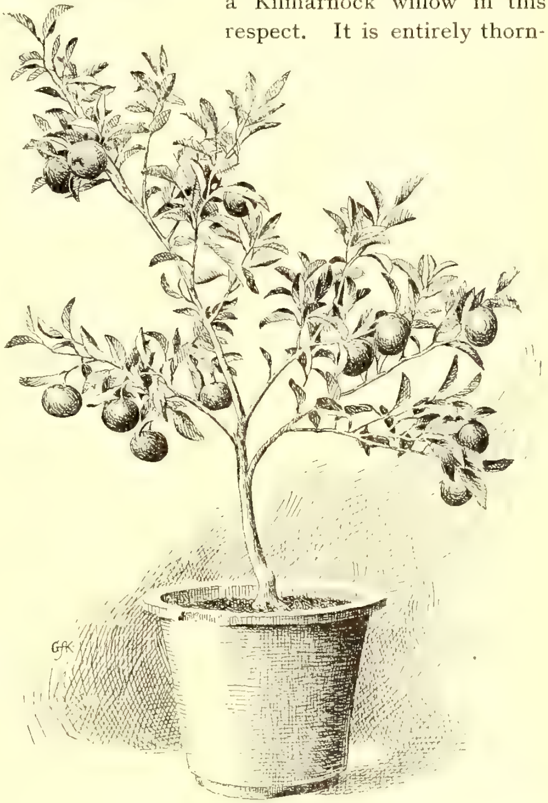
The Satsuma—also called Oonshiu, Kii Seedless, etc.—is probably the highest development of the Mandarin type. It is a pretty orange of the flattened shape of the class, but with a rougher skin than either the Mandarin or Tangierine. This skin is a reddish orange in color, and of peculiar leathery texture. The segments are but loosely adherent, so that the orange is readily eaten out of hand without spilling the juice; this, however, is characteristic of the species, as is also the peculiar looseness of the skin, which has caused these varieties to be called "kid-glove" oranges in the market, from the facility with which the skin is removed. The impression that a good orange cannot be enjoyed gracefully will not be verified in the case of this type; the small, delicate segments can be separated and eaten without in the least soiling the hands or face. It is practically seedless; some specimens have one or two small seeds. Being with out the rank and somewhat "fishy" odor of the type, it does not offend the nostils, while it surely tickles the palate; the flavor is something surprising. I have frequently handed sections of a Satsuma, without comment, to friends not acquainted with it, waiting in silence the exclamation, sure to come: "Why, it tastes like a cherry!" Sometimes the impression was that of a strawberry flavor, and I have noted two or three entirely distinct bouquets, if they may be so called, in the same fruit. To most people this orange is delicious, and other varieties, however good, lose their desirability in comparison with it.



A Florida Satsuma, Four Years Planted.

The Satsuma is said to have been introduced into Florida about 1880 by Mrs. Gen. Van Valkenburgh, who brought it from the island of Kiusiu, one of the Japanese group. Since, it has also been introduced by way of California, under its Japanese name—Oonshiu or Unshiu. There is no difference, although many claims have been made as to the superiority of the California sort. A critical comparison of the fruit of each shows them to be identical. It is another one of the many excellent things which our Japanese friends are discovering to us, and for which we should be grateful to the "Yankees of the East."

The tree is rather dwarf, and reclinate in habit, the branches drooping to the ground, resembling somewhat a Kilmarnock willow in this respect. It is entirely thornless, and marvelously productive—a tree planted but four years on the grounds of R. D. Hoyt, at Bay View, Florida, had on it 625 fruits early in



A Satsuma Grown Under Glass.

December. This tree, which is illustrated herewith from a photograph, was 4½ feet high, and about 7 feet through. This dwarf habit renders the fruit easy to gather, and the tree is exceedingly handsome and attractive in appearance, as may be imagined.

A remarkable feature of the Satsuma when budded on *Citrus trifoliata* stock is its hardiness, which is yet an unknown quantity, as none have ever succumbed, even where the ground has been frozen several inches deep. It is suggested that it may introduce profitable orange culture into Texas; trees of Satsuma set there several years ago have done remarkably well. Indeed, it is possible that in a sheltered spot the variety may be hardy as far north as Delaware, and by acclimation come yet more into the so-far-forbidden land for orange culture; who knows! With a hardy stock and a still hardier bud, the elements are certainly favorable for an extensive widening of the "orange belt."

The commercial importance of the Satsuma cannot be overestimated. The past winter one nurseryman disposed of his crop at $9 per box, wholesale, in New York, and the demand is certainly limited only by the supply, as the peculiar features of the fruit create a taste for it in any one favorably impressed at first, even where there is a dislike for the original Mandarin type. The expense of growing a crop must be less than for other varieties, so that even when the vastly increased production reduces prices, there will still be a profitable margin. The variety keeps fairly well, and packs very attractively, owing to its peculiar skin.

There has been extensive planting of budded Satsumas in Florida in the last two or three years, particularly since the trees have been offered by nurserymen at reasonable prices. A large production of the fruit may therefore be expected in the next few years, when all the county will have a chance to become acquainted with this fine variety.

Owing to the dwarf habit of the Satsuma it is admirably adapted to pot culture; moderate-sized plants grown for two years only in greenhouses in Virginia, have produced 40 to 60 fruits each, and make a very handsome display when set with the oddly shaped oranges. Indeed, there can be but little question that this is one of the most valuable introductions of many years among citrus fruits.

J. HORACE MCFARLAND.

CITRUS TRIFOLIATA AND THE DWARF ORANGES.

The introduction of the Satsuma type of oranges and the use of *Citrus trifoliata* stocks promise to extend and greatly modify the culture of the orange. It appears that both the stock and the variety are peculiarly hardy, and apt to succeed where climatic conditions prevent the profitable culture of other citrus fruits. In addition to the Satsuma or Mandarin type, other varieties are dwarfed and will flourish when budded on the trifoliata stock, and it provides an easy means of making trees for pot culture which shall bear early and abundantly. Dr. Devron, of New Orleans, writing to the *Southern Horticultural Journal*, makes the following remarks concerning *Citrus trifoliata*:

"Having been one of the first to cultivate the *Citrus trifoliata* in the open ground, in the United States, and perhaps the first to see it bloom and produce fruit in this country, I must say that I know of no variety of the citrus family that can be more neglected, more exposed to the extremes of temperature, or to excesses of moisture and dryness, with so much impunity. In seventeen years that I have had that citrus under observation I never found an injurious insect on the tree, or its leaves, flowers or fruit. The *Citrus trifoliata* used as a stock offers another advantage—the portions above the bud when removed are not lost; when treated as cuttings they readily strike root and furnish new plants for the following year—a fact which renders this stock very cheap in production.

"The tree in Louisiana grows to the height of 10 to 12 feet, with numerous straight, stout and very sharp thorns (a good substitute for our barbed wire); the leaves are trifoliate, the flowers are very large and have no odor, or if any, a very faint one. In New Orleans this tree is a deciduous one, and its flowers appear a week or two before the new leaves.

"I have been told that this tree is an evergreen in Japan, but in my garden in this city it is always a deciduous tree, except seedlings of less than two years, which retain their leaves the first winter. The unpalatable but very pretty fruit is of the size of a Mandarin orange, and contains some thirty seeds, which on being immediately planted reproduce the original plant, thus proving this tree to be a wild plant, and neither a hybrid nor a sprout from some other citrus. When the first blossoms of March do not produce much fruit a second and third bloom occur in May or June, and yet all the fruits mature at the end of October. In November the leaves turn yellow and drop gradually, so that at the end of December none remain.

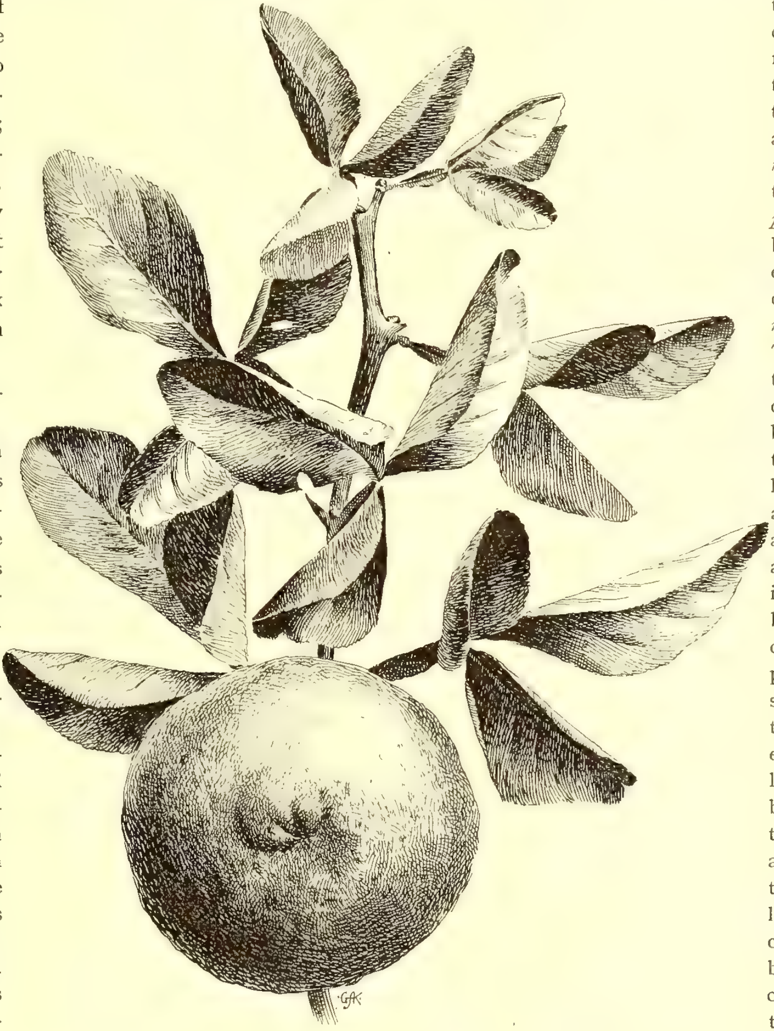
"The deciduousness of this citrus increases its hardiness; being dormant in winter and the circulation of the sap very limited, rupture of the cells and death to the plant by freezing temperature is nearly impossible in any of our Southern States."

Mr. J. L. Normand, of Marksville, Louisiana, finds that the tree will endure a zero temperature. It is coming to be considerably used as a stock for oranges, particularly for the Satsuma or Oonshiu. A fruiting branch is shown in the cut on this page.

The Satsuma or Oonshiu orange is undoubtedly one of the most valuable of the recent acquisitions to our Southern horticulture. The illustration of a pot-grown tree on page 269 will be interesting to amateurs in the north who wish to grow curiosities.

APHIDES, OR PLANT LICE.

Few plants except those of the lowest orders are exempt from the ravages of aphides or plant lice, though some are injured much more than others. Some species of aphis confine their attention to particular species of plants; others attack several species. Thus the poppy aphis and that which feeds usually on the pink are also found on asparagus.



A Fruiting Branch of the Satsuma Orange.

Aphides in general are wingless, but in the autumn winged specimens of both sexes appear. The eggs are laid in the crevices of bark and similarly sheltered spots. The insects hatched from the eggs shed their skin several times, but remain wingless. They are all female, and multiply asexually when from four to ten days old. A single aphis produces about 90 young, and it is stated that 5 generations have been produced between July 12th and August 19th. The fifth generation, if none perished before reproduction, would amount to 6,000,000,000. Another observer has stated that at least 20 generations are produced in warm, moist seasons. The eggs laid by the later generations in early autumn hatch in a few days, producing winged females and a comparatively small number of males. These reproduce sexually, and the eggs are laid in sheltered positions as before mentioned. The color of aphides varies with that of the plant on which they live. The apple aphis, *A. mali*, is light green; the plum aphis, *A. pruni*, green or bluish-green, covered with a whitish dust; the rose, *A. rosæ*, is dark green. Those feeding on the elder, the cherry and the bean are blackish; those found on the linden are yellow, and the cabbage and white thorn aphides are whitish-gray. On the back of most species are two hollow prominences, the so-called "honey tubes," from which exudes a sweet liquid much sought by ants. The latter, by stroking the aphides, increase the flow of this liquid, and are then commonly said to be "milking their cows." The idea that ants destroy aphides is erroneous, however.

The aphis feeds by choice on the youngest and softest parts of plants, extracting their juices by means of its long proboscis. The part of the juice not digested exudes from the honey tubes. As the insects are chiefly found on the under side of leaves, the sweet liquid falls and forms the shining substance known as "honey dew" on the *upper* side of the leaves beneath. Here, being very sticky, it accumulates dust and the cast-off skins of aphides, and in this way closes the pores and injures the plant. It also does harm indirectly by catching from the air the spores of rust and mildew.

To counteract these injurious effects, one of the best means is to keep up the general vigor of the plant by an abundance of plant food. It is also highly important to instantly destroy the first aphides appearing in the spring. Experiments have been made with various remedies, including oxalic acid, benzine, carbolic acid and Nessler's and Koch's fluids (soap solutions containing tobacco and quassia respectively). The last two have proved the most effective. Simple infusions of tobacco and tomato leaves have been found useful. It is necessary for the fluid to come in contact with the aphides. The plants must therefore be carefully sprayed from all directions, or the affected parts dipped in the solution if possible. Unfortunately the solutions, if too strong, are liable to injure the plants. It is therefore desirable to wash them off with water as soon as the insects have been destroyed. Recently a substance called "Schmidt's Nicotina" has come into use in Germany which is said to kill the insects without doing any injury to the plants.

Among natural enemies of the aphides are the ladybird (*Coccinella septempunctata*) and an ichneumon fly. The former, as well as its larva, feeds upon aphides and the ichneumons deposit eggs in their soft flesh.—*Translated from Rosen Zeitung.*

WESTERN NOTES OF APPLES.

Gano Apple, Fig. 1. Fruit large; form roundish, slightly conic; skin smooth; color light yellow, covered with rich crimson red. Some little mottled; dots small, numerous, yellow; stem medium slender; cavity wide, deep, green, regular; calyx rather large, slightly open; segments short, erect; basin narrow, abrupt, rather deep, very slightly furrowed; core large, wide, closed; carpels small, hollow; seeds large, ovate, dark brown; flesh very white, tender, moderately juicy, very mild sub-acid; quality good; season, December to March. Tree vigorous, hardy and very productive, very much like Ben Davis; origin, Parkville, Mo. This is one of the new market apples which may take the place of Ben Davis, as it appears to possess all the qualities of it, is a much handsomer apple and will sell better. It is adapted to the same range of country the Ben Davis is, and perhaps further north. It is highly recommended in Missouri and Kansas. An apple that can take the place of Ben Davis is valuable wherever it can be grown.

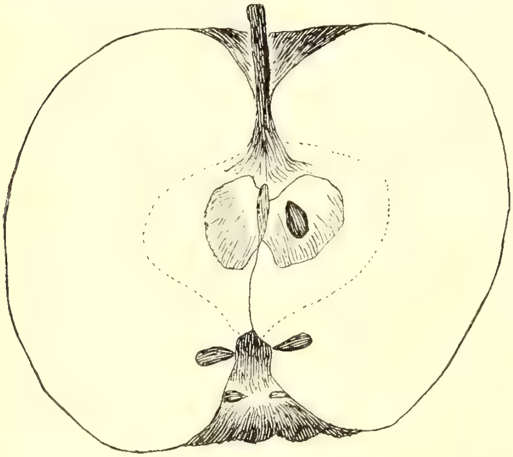


Fig. 3. Seedless Apple.

York Imperial, Fig. 2. Fruit medium to large; form oblate, oblique ribbed, irregularly compressed; color light yellow, striped and mixed with brownish red; dots small, few, gray; stem short, medium; cavity wide, deep, irregular, wavy; calyx small, closed; basin wide, shallow, furrowed or ribbed; core small, solid; carpels wide, compact; seeds long, ovate, dark brown; flesh white, firm, juicy, crisp, sprightly sub-acid; quality good to very good; season, December to March; origin, York county, Penna. Tree vigorous, hardy, upright, spreading; an early bearer, and very prolific. This apple we introduced into this country thirty years ago, and find it one of the very best, keeping about as long as Ben Davis, and is a much better apple. It should not be omitted in planting out a commercial orchard. It has about the same range as Ben Davis and will succeed wherever it does.

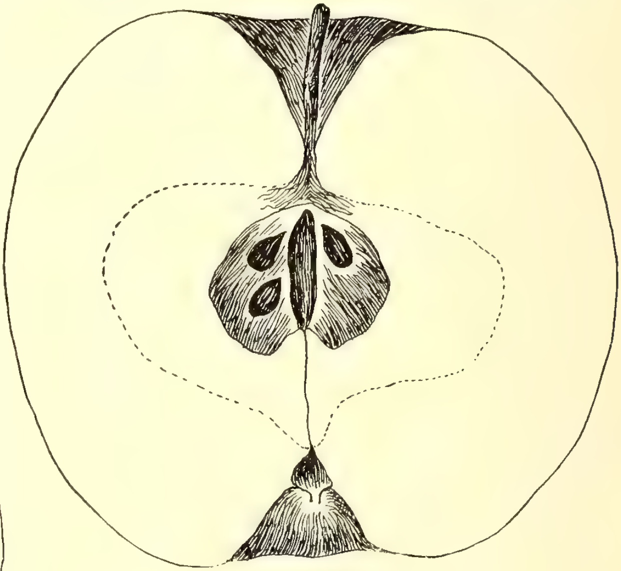


Fig. 1. The Gano Apple.

Seedless Apple, Fig. 3. Fruit medium; form roundish oblate, conic, oblique; color greenish yellow, some mixed and splashed with dark red, some russet; dots small, numerous, russet; stem rather long, slender; cavity rather narrow, deep, russeted; calyx very large, open; segments large, fleshy, being part of the fruit, five in number, distinctly divided and inclined inward; basin wide, deep, with prominent protuberances; core small, solid; carpels nearly wanting, closed; seeds few or none, medium-sized, ovate, dark brown; flesh yellowish white, firm, juicy, mild, sprightly sub-acid; quality good; season, April until September; a very long keeper; origin, Western Virginia, near Bucannon, on French Creek. The seed cells of this apple are below in the calyx, as shown in the cut; few, if any above in the core. This apple we received in 1876 at the Centennial, at Philadelphia, from Mr. Lysander Barrett, of Smicksburg, Indiana county, Pa. We did not at the time consider it of very much value except it might be a long keeper, and was certainly a great curiosity. We scarcely think this the same apple described in the January number of THE AMERICAN GARDEN, although it possesses many of the same characteristics.[*]

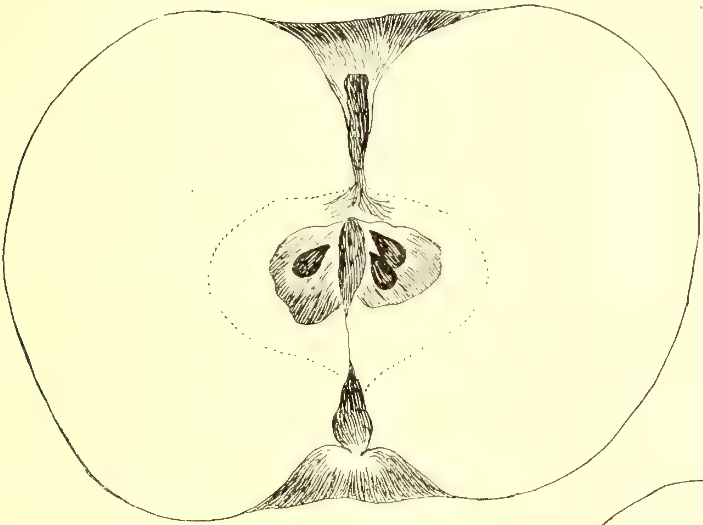


FIG. 2. THE YORK IMPERIAL.

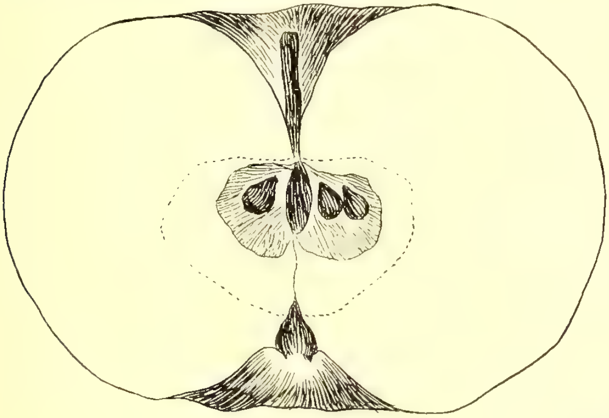


FIG. 5. THE BENHAM APPLE.

Adam and Eve, Fig. 4. Fruit below medium; form roundish oblate conic, double, perfectly united, one larger than the other; color bright yellow, covered, mixed and splashed with bright rosy red, very handsome and attractive; dots small, numerous, distinct, gray; stem long, stout, double below; cavity wide, deep; two calyxs separated, closed; segments long, erect; basins very narrow and shallow, or none; cores double, open; carpels large, hollow; seeds small, angular, long, dark brown; flesh yellowish white, stained beneath the skin, tender, juicy, sprightly, pleasant sub-acid; quality very good; season, winter; said to be hardy and a good bearer. A seedling originated by Joseph Rymal, Hamilton, Ontario, Canada, of whom I received specimens in 1876, at the Centennial, Philadelphia. He said the tree uniformly bore the same kind of apples. A large plate of them were exhibited that were very much admired for their great beauty, as well as for their singularity.

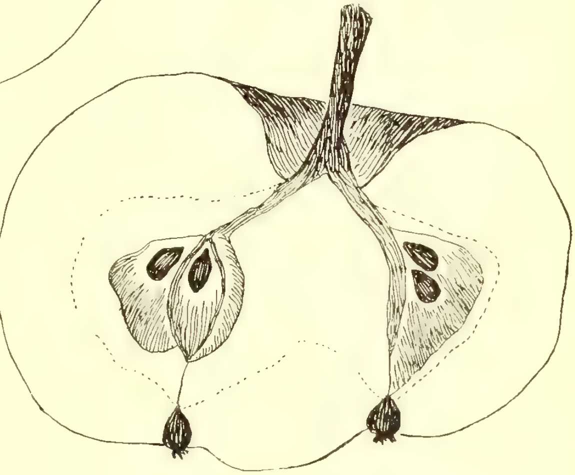


FIG. 4. ADAM AND EVE.

Benham, Fig. 5. Fruit medium to large; form oblate, compressed, slightly angular and irregular; color deep yellow, covered, mixed and splashed with light and deep bright, rich red, very handsome; dots small, scattered, light and gray; stem short, slender; cavity wide, deep russeted; calyx large, open; segments short, erect; basin very wide and rather shallow, irregular, furrowed; core medium, compact; carpels small, slightly hollow; seeds small, plump, ovate, dark brown ; flesh yellowish, a little coarse, rather firm, moderately juicy, mild, rich sub-acid ; quality very good ; season, March. Tree said to be good grower, hardy and productive. Originated by F. M. Benham, Petoskey, Michigan. This is a very handsome apple, and appears to be a good keeper in Michigan ; specimens received in good order March 18. An apple as handsome as this would sell well in any market. It looks as if it might be a seedling of the Baldwin. It is adapted to all sections where the monthly mean temperature is the same as Michigan, but cannot be of any value in Kansas and in any other section of the same mean temperature, as it would be a coarse fall apple.

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[*] It is to be observed that this apple comes from the same party as the one recorded by Mr. Fuller in the first American literature of the bloomless apple, and it is undoubtedly therefore the same. See AMERICAN GARDEN, Jan., 1890, p. 7.—ED. AM. G.

Kansas Beauty, Fig. 6. Fruit large ; form oblate conic, sometimes slightly oblique ; color rich yellow, often with a blush very handsome ; dots medium, numerous, suffused, white ; stem medium slender ; cavity wide, deep, regular, yellow, sometimes slightly russeted ; calyx rather small, closed, or very slightly open ; segments short, erect ; basin rather narrow, shallow, slightly furrowed ; core rather small, closed ; carpels small, slightly open ; flesh yellow, tender, juicy, mild, pleasant sub-acid, very good ; season, September to November in Kansas, about with Jonathan. A seedling of the McAfee, by the late Dr. W. M. Howsley, of this place. This is one of the finest and most showy apples, which would command the very highest price in any market. The tree appears hardy, erect, spreading and productive, and if it was grown about two hundred miles north of here, would be a valuable winter apple.

All the above are fully distinct, and valuable.

Leavenworth, Kansas. J. STAYMAN.

THE ORIGINATION OF VARIETIES.

ASTONISHING RESULTS, BEATING NATURE WITH LIGHTNING SPEED !

MUCH is said about the getting-up of new varieties of fruits, vegetables, flowers and plants, and it is a grand thing. There is great satisfaction and profit in living in this wonderful age when so many grand new good things are all the time being advertised in the catalogues. The gardeners of these days do not realize how great their advantages are in the originating of superb new things. Before the time of handsome catalogues and grand impartial periodicals, it was a difficult matter to get up anything really new and good.

I hope, Mr. Editor, that you will pardon any reference to my own work, but some of the younger generation may not know about the difficulties which an ambitious gardener twenty years ago had to overcome. Those whose recollections run back into the fifties may recall some of the grand new novelties which I sent out in a modest way. As soon as I had become acclimated to this American soil, I was sure there was money in it, if it could only be gotten out. So I set out to breed up new vegetables, and I was successful, for I knew that I should be from the start.

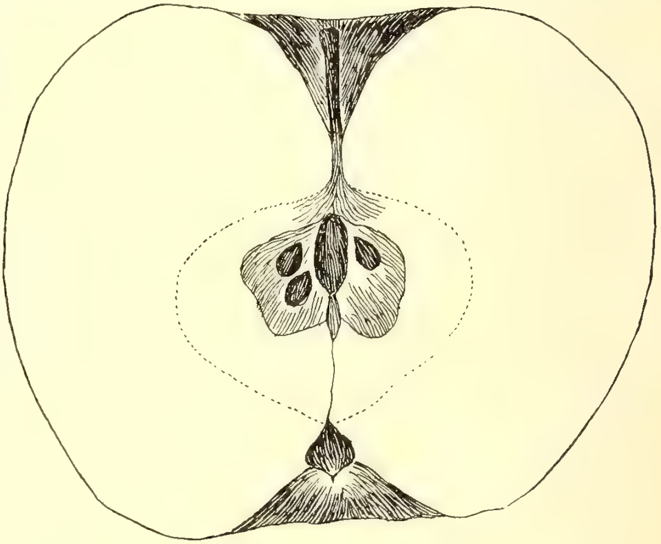

FIG. 6. KANSAS BEAUTY.

My first attempt was with potatoes, for I was fully convinced that the potato is an important food product. I planted a half acre of the old Davis' Seedling, and by carefully marking the earliest plants, I had collected enough seed by fall to make a grand new variety, and I sent this out the next spring as Choke's New Early Dawn Morning Star. It was a grand success, for I recollect that the fifty bushels which I had to sell netted me over $15 per bushel. The seed was bought by so many persons, that I knew it would be unprofitable to grow it another year, so I set to work to breed up a new variety the next year. To do this and be sure that I should get a superb good thing, I selected eight bushels of the biggest Davis' Seedlings I could find, and planted them upon my best soil. In the fall I again selected out all the biggest potatoes, and I had a magnificent new variety, which I named Choke's Grand Arc de Triomph. This was a bigger success than the first; but as potatoes are bulky things to ship and handle, I decided to try my hand at seeds, for I had by this time got a good deal of notoriety as an originator.

I began in the spring of 1856 with lettuce, cabbage and squashes. I had no idea of getting a new variety of lettuce when I set out. But I noticed, when sowing my Brown Silesian that spring, that some seeds were a little darker colored than others. I had forgotten about this until my lettuce began to bear, when I noticed that a few plants had greener leaves than the others and the leaves were curly. So I knew that the dark-colored seeds had produced these plants. In the fall I sorted out all the dark seeds from the lettuce patch, which was an easy matter, for they were nearly all dark colored. This new variety I called Choke's Superlative Green and Brown Curl-Fringed Extra Early Summer lettuce. It sold well, and I think that it was superior to many of the best varieties of the present day.

In cabbages I built upon the Early York; by selecting the shortest plants and those with fewest leaves, I was enabled, in two years, to send out Choke's Superb Incomparable Dwarf. And by hybridizing this with the Bergen Drumhead, which was then just coming into favor, I secured a strain of intermediate season, one which was admirably adapted to any kind of soil or treatment. In fact, they would grow under total neglect. These were the hardiest cabbages I ever saw. Some may still remember these as Choke's Inexhaustible Sure-pop Hardy.

The squashes are exceedingly amenable to treatment, as the farina, or impregnating fluid, is scattered by insects and wind, and one can get any number of hybrids, etc., between all kinds of melons and pumpkins and squashes and cucumbers. I sent out no less than a dozen grand new novelties in less than three years.

During all this time of scientific experimenting, I lived in a small town where printing facilities were not good. Early in the sixties I moved into Philadelphia, and there I found wonderful facilities for carrying on my scientific work. Many gardeners had been stimulated by my successes, and I was enabled to buy any year, for a hundred or two dollars, a number of new and valuable varieties. My best hit was the enlargement of my single price-list into a catalogue, and I soon added a colored plate. I have always thought that the colored plate is the most valuable aid we have in the scientific getting-up of sorts. A number of the varieties which I introduced in those early days are changed into other kinds. I would particularly mention in this connection Choke's New Golden Butter Cream turnip, Choke's Large Colossal Excelsior turnip-beet, and Choke's Wonderful Twenty-Eight-Day cucumber.

My only object in writing this and in drawing some observations from my own experiments, is to urge on the grand work of progress in the rising generation.

R. T. CHOKE.

HYBRIDIZING THE WILD CRAB.

The February number of THE AMERICAN GARDEN contains valuable suggestions in regard to the improvement of the wild crab of the northwest (*Pyrus coronaria*) by A. W. Sias. In the spring of 1886, at Ames, Iowa, blossoms of *Pyrus coronaria* were succesfully pollinated with pollen of the Roman Stem apple. Fruit set, but the seeds were mostly abortive. The following year the same work was repeated with practically the same result. In 1888, at the Iowa agricultural college, using the Soulard as female parent, I pollenized about eighty blossoms with eight varieties of the common apple, ten blossoms to each variety. Fully sixty per cent. set fruit and yielded fertile seed. At the same time parallel but less extensive experiments were in progress with the typical *Pyrus coronaria*, with results as in former years. Of course this does not convince me that the wild species cannot be hybridized, as in one case two or three seeds were obtained, but it points to a wider divergence from the apple than in the case of the Soulard. The difference in the blossoming period between the crab and the apple may be overcome by obtaining pollen from other latitudes. There is certainly a promising field, and one which has been too much neglected by plant breeders thus far. As Mr. Sias suggests, selecting the largest and best specimens of the natives is the first step, this to be followed by hybridizing with Russians or other hardy varieties. Mr. Patten's efforts have been so successful as to commend this line of work to the careful attention of all who are interested in raising fruits to meet the requirements of the cold north.

JOHN CRAIG.

Central Experimental Farm, Ottawa, Canada.

A RACE OF FLOWERLESS PLANTS—IV.[*]

HOW FUNGI ARE DISPERSED, WITH HINTS FOR THE CULTIVATOR.

Animals as a rule have the power of locomotion, at least during some period of life. Plants as a rule have not the power of locomotion at any period of life, the principal exceptions being the adult forms of some water plants, algæ, notably diatoms, and reproductive bodies of certain flowerless plants. The species of palms are very local in most cases. The big trees of California are local and liable to become extinct; but most flowering plants are more or less widely distributed, and many have special adaptations for dissemination, such as the winged fruit of the maple and ash, the barbed prongs of the beggar-ticks, the pulp of the cherry, the aril of the water-lily seed which enables it to float, the down of the thistle, and many others. The power of the touch-me-not to throw its seeds several feet by means of the elasticity of the pod is especially interesting in this connection. Among cryptogams, fungi are the most numerous and most varied in their forms and adaptations, and may be expected to have the most devices for dissemination. We will consider how the spores of fungi are expelled by internal forces, how they are carried by external forces, how they survive unfavorable conditions, and how they gain entrance into their host plants.

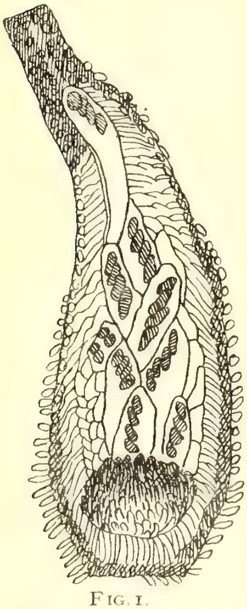
FIG. 1.

A large number of fungi have the power of forcibly expelling their spores when ripe and throwing them to a greater or less distance. Some of these are *Discomycetes*, a group which may be represented to us by a red cup-fungus common on the ground or sticks in the woods. Two different writers in the *Botanical Gazette* for 1883 record that on opening a small box in which some of these fungi had been placed to keep them fresh, the spores were shot out so forcibly as to make a noise. In experiments made by a writer in *Science Gossip*, not only was a fizzing noise heard, but their activity was excited by blowing on the plant and the spores were showered forth in all directions. These cases are mentioned as if exceptional, but according to De Bary this is the usual thing in fungi of this class. Figure 2 represents one of the allied *Ascomycetes* with spores ripe and ready to be discharged from the ascus. Figure 1 is another example of the same process slightly modified. Sometimes the spores are thrown upon the leaves of flowering plants that happen to be growing near, and in one such case they were taken for a parasite and described as a new species. A remarkable case is that of a supposed disease of roses in a greenhouse. The florist found his roses covered with black specks and sent them to a mycologist for examination. It was observed that the spots could be picked off with a needle; they were not attached, but simply lying on the leaf. A section showed nothing of the fungus inside the leaf. Upon inquiry, the florist wrote: "About seven days after the dressing of manure was put on the black speck began to show itself. It was like a little black tick on a drop of water. The surface of the manure was all covered with them, and when the sun would rise in the morning the little bristle-like ball would burst and throw the black tick up. Some were thrown as far as eight feet, but they were very thick at from three to four feet." This was evidently *Pilobolus*, but the same kind of spores on rose leaves were described by another botanist as a new species belonging to a different group. *Pilobolus* is a large mold that grows on horse dung. Its fruiting stalks are terminated by a spore-case in the form of a black cap, which contains the spores. Just below the tip is a large swelling in the hollow stalk, and at maturity this, as well as the spore-case, absorbs water and becomes distended. There is a ring which is weaker than the rest, and here at length a rupture suddenly takes place and the black spore-case full of spores is thrown some distance, as described above.

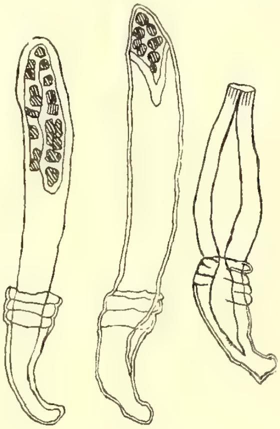
FIG. 2.

A similar thing on a smaller scale occurs in a fungus which grows on flies. Keep watch of the window-panes in autumn, and you will see an occasional dead fly adhering to them and surrounded by a white halo. The fly is infested and killed by a fungus which forcibly throws its spores in all directions. They adhere to the glass and form the halo. The process in mushrooms is

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[*] Figs. 1, 4, 5, 6 and 7 are after De Bary; Fig. 2 after Pringsheim; Fig. 3 after Hine, and Fig. 9 after Brefeld.

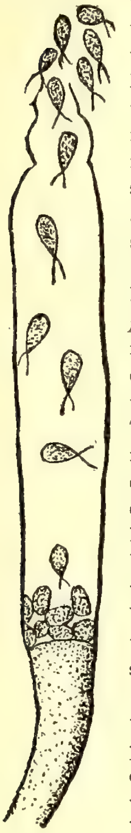


FIG. 3.

similar, but their structure is different. The spores are borne externally. A special cell has four prongs at the tip, each bearing a spore. At maturity the end of the cell is shot off, carrying the spores with it. Professor T. H. McBride records a case in which the spores were projected two or three feet in all directions. He thinks the hymenial layer must be hygroscopic. The same observer speaks of the ejection of the spores of slime-molds from some cause not understood.

There is another class of fungi which live in water, and among them is the *Saprolegnia*, which sometimes causes an epidemic among fishes, notably salmon, called the "salmon disease." The spores themselves have the power of motion. They are formed in a long sack-like terminal cell (Fig. 3), and are first forced out by a process similar to that already described. Once free, they are seen to have two slender appendages, which vibrate very rapidly and propel them through the water with a motion resembling that of the infusoria. So much for the dispersal of fungi by power in themselves.

Fungi also manage to make animals and the forces of nature serve them as other plants do. A man walking through a field of rusted wheat gets his clothes covered with yellow spores, which, perhaps, adhere more closely because of the minute spines which cover the surface. Many peculiar molds grow on the excrement of various animals, and are found nowhere else, in many cases not even on the excrement of a related animal. Do their spores germinate only after passing through this particular animal, or are they lying about, able to grow only on that particular kind of excrement? Perhaps insects carry the viscid secretions of pear-blight and other substances containing bacteria. It is even suggested that the bad odors accompanying putrefaction are designed to attract insects. Some think, apparently with good reason, that pear-blight enters the tree through the blossoms. Is the virus carried to the blossoms by insects which have first been attracted to the bad-smelling viscid secretions of a diseased tree?

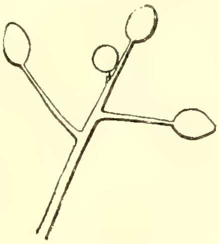


FIG. 4.

A recent writer in the Annals of Botany has taken great pains to show that the large stink-horn fungi have their spores carried by insects, and are especially constructed with this object in view. He convinced himself by observation that this was the case in the common species, and then reviewed the various species growing in all parts of the world to show the special adaptation of the group as a whole. He shows that the spores are enclosed and protected until maturity, when the plant rapidly expands, not by growth, but by mechanical means, being released from confinement, reaching a height of several inches in about two hours, and this at a favorable time of day. Thus the plants are not liable to be destroyed by other animals or by accidents before insects visit them. Ninety-six per cent. of the species are bright colored, as compared with twenty-five per cent. of other fungi and seventy-three per cent. of flowers. Three-fourths of the species have the fetid odor.

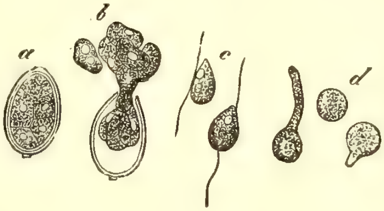


FIG. 5

While speaking of insects, we should not forget the case of earth-worms bringing up the germs of charbon or anthrax from a buried animal, and thus communicating the disease to cattle eating grass from the spot.

A smoking lamp fills the air of a room with particles of soot which may float as far as an adjoining room, and are large enough to be seen as they slowly settle. Particles which compose a cloud of dust driven by the wind, and even particles of dust about the house, are plainly visible separately when they settle. Having this in mind, we cannot question for a moment the ease with which spores of a puff-ball or of corn smut, too small to be seen separately, may float in the air or be carried long distances by the wind. The same is true of the spores of many other fungi, including some of those which forcibly eject their spores, mushrooms for example.

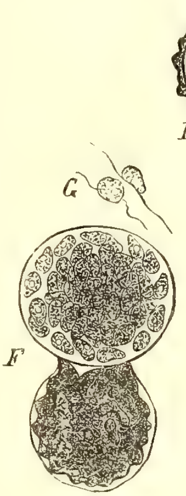


FIG. 6.

Wheat-rust, whose winter spores remain attached to the straw, produce a kind of secondary spores (Fig. 7) which are adapted to being thus transported. The same is true of the cedar-apples (see March number, p. 137, Fig. 2). For the propagation of some fungi the presence of two different flowering plants may be necessary, as in the case just mentioned, where one stage of growth is on the apple tree, the other on the cedar. There should be no apple-rust where there are no cedar trees. A disease in a given plant may be kept alive from year to year by allied wild plants which harbor the fungus, as grape mildew on Virginia creeper. The spores of many parasitic species remain for a time, at least, attached to the leaf or stem on which they grow, or imbedded in it, as do the winter spores of the grape mildew. The leaves are blown about by the wind, or perhaps make voyages on a stream of water. Rusted straw is gathered up and transported to another place with the spores of the fungus attached.

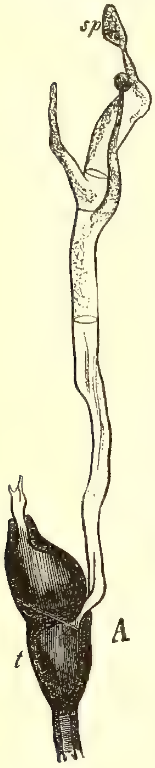


FIG. 7.

Spores which have the power of moving in water have been mentioned. There are also some fungi, certain smuts, which grow on submerged plants and whose spores must be disseminated by the currents.

It is very common for a fungus to have at least two kinds of spores, one of which cannot survive unfavorable conditions, but must germinate soon after maturity or perish. The other kind, the most highly developed fruit of the fungus, is usually made to resist unfavorable conditions. In wheat-rust, it is a thick-walled spore attached by a permanent stalk. The winter spores of the downy mildew of the grape are imbedded in the leaf and enclosed each in a thick-walled and durable spore-case. Pear-blight bacteria may live over winter in branches that have been cut off and produce the blight in other trees in the spring.

The ergot fungus forms a horn-shaped mass, in which it stores up a good quantity of food for itself. It falls to the ground in autumn and lies till spring, when growth is renewed and highly developed spores are formed, which at maturity are shot forth like arrows. Some are thrown upon the growing rye and other grass, where they renew their cycle of growth.

In regard to the smuts of the cereals, there have lately been startling discoveries made by the German investigator, Brefeld. He found that smut spores (of corn, Fig. 9) placed in a nutrient solution, instead of producing tubes in the usual way of germinating, grew by budding after the manner of yeast (Fig. 10). The dung of animals that have eaten smutty corn has been found to contain similar bodies, and it is known that this mode of growth may continue indefinitely. If smutty corn is thrown into a manure pile, a similar result may be expected. In either case the fertilizer is infected. Then the farmer scatters it over the field and corn is planted. As soon as the corn comes up the smut seizes upon it, enters and goes through its tissues in the usual way, and the result is a sooty mass of spores and damaged corn.

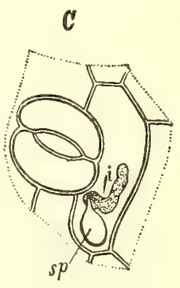


FIG. 8.

Different fungi get into their host plants in special ways. The way corn-smut gets into its host was discovered only after years of trial. It enters only at the tenderest part of the very young stem when the corn is coming up. When the growth of the corn is fairly under way, no smut can infect it. The germinating secondary spore of wheat-rust gets into the barberry bush by making a hole in the epidermis, through which it passes (Fig. 8). Molds sometimes get into canned fruit and into the culture-tubes of the bacteriologist, where even bacteria cannot get in, because the molds form long slender tubes or threads which penetrate through crevices, while bacteria would lodge and go no further.

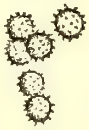


FIG. 9.

In some fungi, several of the above modes of dissemination occur, notably in potato-rot, grape-mildew and their allies. Figure 4 represents one of the fruiting filaments of the potato-rot fungus, with spores on the tips of the branches. During a dry afternoon these threads become dried up and twisted, somewhat like a microscopic shred of cotton. A very little moisture is sufficient to be absorbed and render them turgescent again, and in absorbing the water they quickly untwist, and the movement throws off the spores in all directions. There is no reason to doubt that they float easily in the atmosphere and may be carried a considerable distance, especially if the air is laden with dew or fog. The latter conditions are especially favorable to germination, for the spores germinate in water in this way: the protoplasm inside the spore divides up into several portions, each of which becomes a motile spore (Fig. 5). They all pass out through a small opening in the tip of the spore, and by means of their two cilia move about rapidly in a drop of water (Fig. 5). At length they come to rest and germinate by sending out a tube, which penetrates through a stomate into the interior of the potato leaf. Figure 6 represents a resting spore of an allied species, in several stages of germination. It is protected by a thick-walled spore-case, which enables it to survive the winter, and at the proper time it germinates in the same manner as the summer spores just described.

CONCLUSIONS. Burn fallen leaves of diseased plants and branches cut from blighted pear trees.

Do not allow moldy or spoiled food to stand about the house, scattering spores. Keep free from molds and germs of all sorts, or get rid of them at their first appearance.

Cut out your corn-smut before the sooty mass is exposed to air.

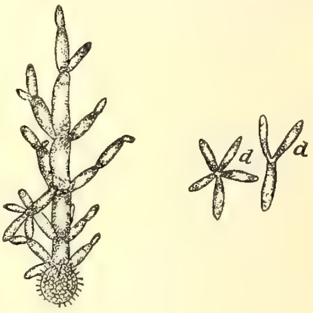


FIG. 10.

Do not feed smutted grain or fodder to cattle, nor throw it into manure heaps, nor put manure containing smut spores on grain fields.

Practice rotation to avoid infection from fungi in the soil, in the fertilizer or on stubble, leaves, etc.

Fungicides are best applied on a dry day, when the only water that touches the spores is the poisoned water.

Harvard University. A. B. SEYMOUR.

REMEDIES FOR THE STRIPED CUCUMBER BEETLE.

There are probably few injurious insects for which more remedies and preventives have been recommended than for the striped cucumber beetle (*Diabrotica vittata*), the everywhere abundant yellow "bug" with black stripes along its back, which attacks squashes, cucumbers, melons, and in fact nearly all cucurbitaceous plants. A large proportion of these remedies are doubtless worthless, if, indeed, not positively injurious.

In order to get at a more definite knowledge of the value of these various substances, the writer undertook, last season, at the Ohio Agricultural Experiment Station, a series of experiments, in which it was designed to give each a field test, and to arrive, if possible, at some reliable conclusions for the guidance of the interested public.

The methods that have been proposed for preventing the injuries of this insect may be divided into four classes: 1. Keeping away by strong odors supposed to be offensive to the insects. 2. Coating the plant with substances so as to make a mechanical barrier to the insect. 3. Coating the plants with poisonous substances. 4. Fencing out the insects.

Four experiments with the first class of preventives were conducted, the substances used being hen manure, cow manure, kerosene and crude carbolic acid. The latter was the most effective of the four, having an evident effect in keeping away the beetles; but even it was not a complete success. The three other substances were practically worthless.

Two substances of the second class were tried—saltpeter and gypsum. The former proved worse than useless, while the latter had quite a decided effect in saving the plants; not sufficient, however, to make it reliable where the beetles are as thick as they often are in many parts of Ohio.

The same may be said of substances of the third class—the diluted poisons. We tried both slug shot and peroxide of silicates. The former proved directly injurious to many of the young leaves to which it was applied, perhaps because it had been on hand for some time. The peroxide had a decided saving effect, and where the beetles were not very thick, would probably bring the plants through in good condition. But the trouble with all these substances is that the beetles burrow down in the earth about the stem, and devour it, often cutting it completely off. Very often they burrow down in the soil long before the plants have appeared above ground, and eat the stem and seed-leaves so that the plants never come up.

Obviously the only way to prevent this sort of injury is to fence out the insects. Of the various forms of apparatus for this purpose, some are shown in the figures. Perhaps the simplest method, and one which I am told in largely practiced in some of the great melon growing sections of the state, is that of laying a piece of thin cloth over the hills before the plants are up, covering the edges of it with loose earth. We tried this quite extensively and found that it worked very well while the plants were young, but was liable to cripple them if left on too long. To obviate this difficulty, we tried various methods of holding the cloth up in the middle. One of the simplest and perhaps most satisfactory method is to take two pieces of wire and put their ends in the ground so as to form a double arch, like the center arch of a croquet ground. Over this the cloth is laid, the edges being held down by loose earth as before, and as shown in Fig. 7. Or the wires may be twisted around each other, as shown in Fig. 3; or a single long wire may be bent as shown in Fig. 2. A half barrel hoop makes a very good substitute for the wire, as may be seen in Fig. 5.

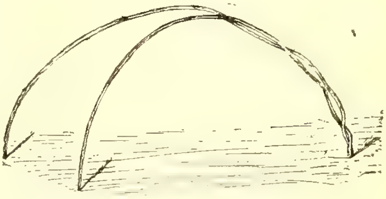


Fig. 2.

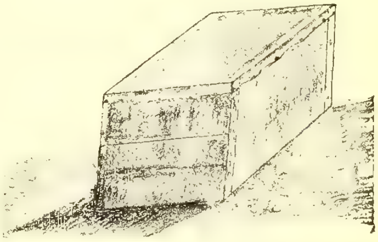


Fig. 4.

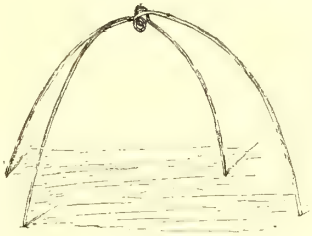


Fig. 3.

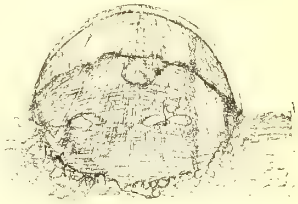


Fig. 5.

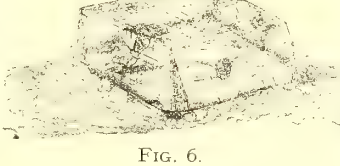


FIG. 6.

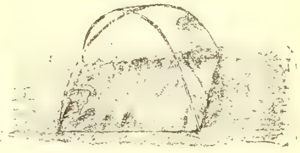


FIG. 7.

The best cloth we found for the purpose is the lightest grade of plant cloth sold by seedsmen. This can be purchased in quantity for three or four cents a yard, and one set of covers properly cared for ought to last at least three seasons. After they have been used on the early squashes and melons they are ready for the late cucumbers. They require little storage room between seasons.

We also tried boxes covered with thin cloth, Fig. 4, and found them less desirable than the cloth, because they do not admit sunshine and air as well, so that the plants do not grow as rapidly and vigorously. When the plant reaches the top, also, it can not lift the cloth with it, while with the cloth alone it can raise it without difficulty.

We also tried a wire screen protector, made by A. I. Root, Medina, Ohio, shown at Fig. 6. This serves an excellent purpose, especially for melons and cucumbers, but is more expensive than the forms above described.

It is necessary to keep the covers on until the plants have put out five or six leaves, and perhaps in case of cucumbers and melons even longer; for the beetles sometimes attack them in great numbers after the covers are removed.

Clarence M. Weed.

A LITTLE PLACE IN THE COUNTRY.

Tenth Paper.

IN FAIR MAY, in May fair, in the month of fair May, we should find the hey-day of both work and pleasure in our country home. Now we may "smell to sweet flowers," taste the first fruits of the garden, feel the yielding of the green velvet of the lawn beneath our feet, and on every hand see the budding promise of reward for all our past and present toil. It is only a pleasure now to work in the garden, for the soil is soft and warm; it crumbles readily as we ply our tools; it yields before us; as soon as seed is committed to its care its life-giving virtues center there, and the seed is warmed and moistened until it germinates; then while the soft breath of May blows above it, and the soft showers of May fall upon it, the plant grows and fruits as though it had been magically nourished.

There are some tender things that we cannot commit to the ground until this month is well advanced and danger from frost is passed, unless we protect them with covers. This we may do in order to have the satisfaction and profit of some early specimens, but it would be too expensive work for the main crops. As these cannot be put in until so late, we must do what we can to offset this, by extra careful cultivation and fertilizing.

We shall not endeavor here to give a detailed "book of the garden," with minute instructions regarding each crop that can be grown therein; but we shall aim rather to suggest such as may enable some profit to accrue from the garden while it is supplying our table with its bounties.

Few fruits of the garden can afford the cultivator more pleasure than the tomato. The poison "Love apple" of half a century ago, only fit to ornament some shelf high above the reach of curious children, has been evolved into "a thing of beauty and a joy forever" to eye and palate. If, as will likely be the case, we are by this time pressed for space in our little garden, we shall have all the greater incentive for doing as much as possible with the remainder. We will make labor take the place of land, and thus get from much work upon a little space what we might otherwise try to get, with larger chances of failure, from less work upon more land. Of course, if we have it, we still want our sandy loam to work upon; but failing in that we may take a piece of clay soil and by careful work obtain as good or even better results than we should upon the other.

In preparing this clay land for tomatoes, after spading it up or plowing and harrowing, we will mark off hills four feet apart each way. Space could be economized by putting the plants somewhat nearer, but the vines should not be so crowded that the free circulation of light and air would be impossible throughout the season. At each hill throw out soil enough to leave a hole as large as a half bushel measure; then mix with the soil which has been thrown out, and which will be used for refilling the hole, half its bulk of moderately coarse coal ashes. These will keep the soil in good mechanical condition, loose and friable, and insure perfect drainage—an important point with the tomato, as it will not do well if its roots are cold and water-soaked. As the hill is made, the hole being filled and heaped up, as it may be, by the addition of the ashes to the soil, a good quantity of old manure should be worked in. If this is not available, a little good commercial fertilizer could be substituted and more of the same be worked in at each cultivation of the plant. This may seem like taking a good deal of trouble, just for a few tomatoes; and it is. The plants could be set in the ordinary manner with much less cost and trouble. Yet an active man could prepare several hundred hills in this way in a day, and 500 plants set out thus, and occupying less than one-fifth of an acre, should produce as much fruit as an acre would under ordinary field cultivation, and in taking into account the question of profit, it must be kept in mind that subsequent cultivation will cost less than if a larger area was to be worked, and the cost of the land is less. As a rule, the smaller the area from which a crop of certain amount is taken, the less the crop will cost per unit of measure.

If the plants are not to be protected by covering, nothing will be gained by setting them out until warm weather is assured. If taken directly from the hot-bed, cold, dark weather, even without frosts, will stunt the plants and prevent their future rapid development. The proper course is to remove them from the hot-bed to a cold-frame in which they may be exposed to the air and the sun throughout the day, but protected at night. In this frame they should also be free from bottom heat, and be given more room than they had in the hot-bed. Being kept in this frame until settled warm weather, they should then be transplanted to the hills with as little disturbance of the roots as possible. If the bed is well watered with a fine rose sprinkler, the plants may be taken up with a good ball of earth about the roots. Transplant in the evening if possible, and the functions of the plant will hardly be interrupted.

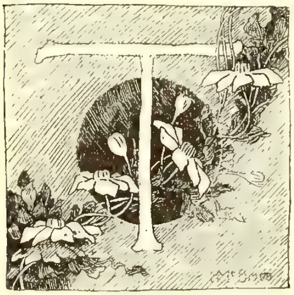
Now, as to the uses and value of the tomato in our garden: First, we may have the delicious and healthful fruit upon our table from August until November. For the surplus product we can easily find a market; first, among those who have no gardens and desire them for the table; second, many families who prefer to put up their own supplies of canned tomatoes and catsup, rather than buy of manufacturers; and third, among the manufacturers or canners, if there are any in your neighborhood. The first tomatoes that may be grown out-of-doors, by means of single, glass-top plant covers, will ordinarily be ready for market in time to bring three or four dollars per bushel. The earliest high prices can be obtained only for Southern shipments or Northern hot-house products: but the next highest will be secured for the product of our early protected vines. But from that on the price declines very rapidly, so that we may be fortunate enough if we can start our main crop at even two dollars per bushel, and work off the bulk of it at 60 to 80 cents. For a few days during the height of the season, and when selling to families in quantities for canning, 40 to 50 cents may be the ruling price, and after that the later and poorer fruit will sell at even less for making catsup. Prices, however, are largely dependent upon the season. Within my own experience I have sold at a *minimum* price of $1, and again found my crop drag at 25 to 40 cents. Even at the lowest of these prices I consider it a paying crop, for it is easily cultivated and handled. If 500 hills are planted, as I have suggested above, they should produce 200 bushels of fruit. This amount should easily be disposed of in a small village, as I have frequently sold 20 bushels in a day, in a manufacturing town of 3,000 population.

Another product which we may grow with the certainty of being able to dispose of all surplus at a profit, is the Lima bean. The chief expense in this is in getting good poles, and the chief difficulty is to get the seed started. If only a few days of cold or wet weather follow the planting, the seeds will be almost sure to rot. They should be examined every few days after planting until they are up, and as soon as they show signs of decaying new seeds should be put in. This may be done without disturbing the hills, as the seeds are merely thrust a little below the surface by the thumb and finger.

Cucumbers for pickles, summer cabbage for a succession crop, the first planting of celery, the last one of peas, and other things which go to complete a well-stocked garden will all be "on the list" for this month, and will all help to make May one of the busiest of the year. Yet with all this work we must not forget that there is another aspect besides that of profit and pure utility to be considered. Although we may have a "cottage with a double coach-house," lawn, fruit, shrubbery, a garden, etc., unless we have flowers, we shall miss an essential factor in our scheme of rural happiness. Having begun in the autumn, and having so much crowded into our first year, has given probably little opportunity for elaborate preparations for floriculture. But with little work and less expenditure of money we can make amends for this by sowing beds of annuals wherever and whenever opportunity offers. By commencing early and making successive sowings each week, we may have an abundance of bloom the whole season through. The list of valuable annuals is too long to be given here, but any florist's catalogue will guide one, not only as to sorts but as methods and times of sowing Borders can be made with these as well as with bedding plants, and they will last long after the latter have been cut down by frost. While doing this, we may also be preparing for the future by selecting now and then some good location for a rose bed, setting therein some of our favorites, and giving them good culture, that they may repay us with bloom next year; or putting a hardy climber about the veranda; or a few bulbs—as our purse may allow—in a rich bed. But let us not try to do too much of this at once; let us rather allow something of it to remain to be done each year, that we may have each season some new interest to attract us out-of-doors.

We have already suggested the value of reading and study as an aid in the work which we have undertaken. But the studying must not all be within doors. The things that we learn from books can benefit us most only when we try their practical application to every-day life. Our garden should be an experiment station in which to test varieties, and fertilizers and methods of cultivation. A note-book should be our constant companion, and not only should dates be put therein, but every seemingly trival circumstance connected with our work. If we fail, this note-book book should show us why; if we have any special success, it should show the reason for that as well, and be our guide in the future. Nothing should be left to chance, and no result should be achieved without our being able to recall the processes and repeat the same conditions, or vary them, as may seem most needed.

A FEW GOOD CLIMBERS AND CREEPERS.

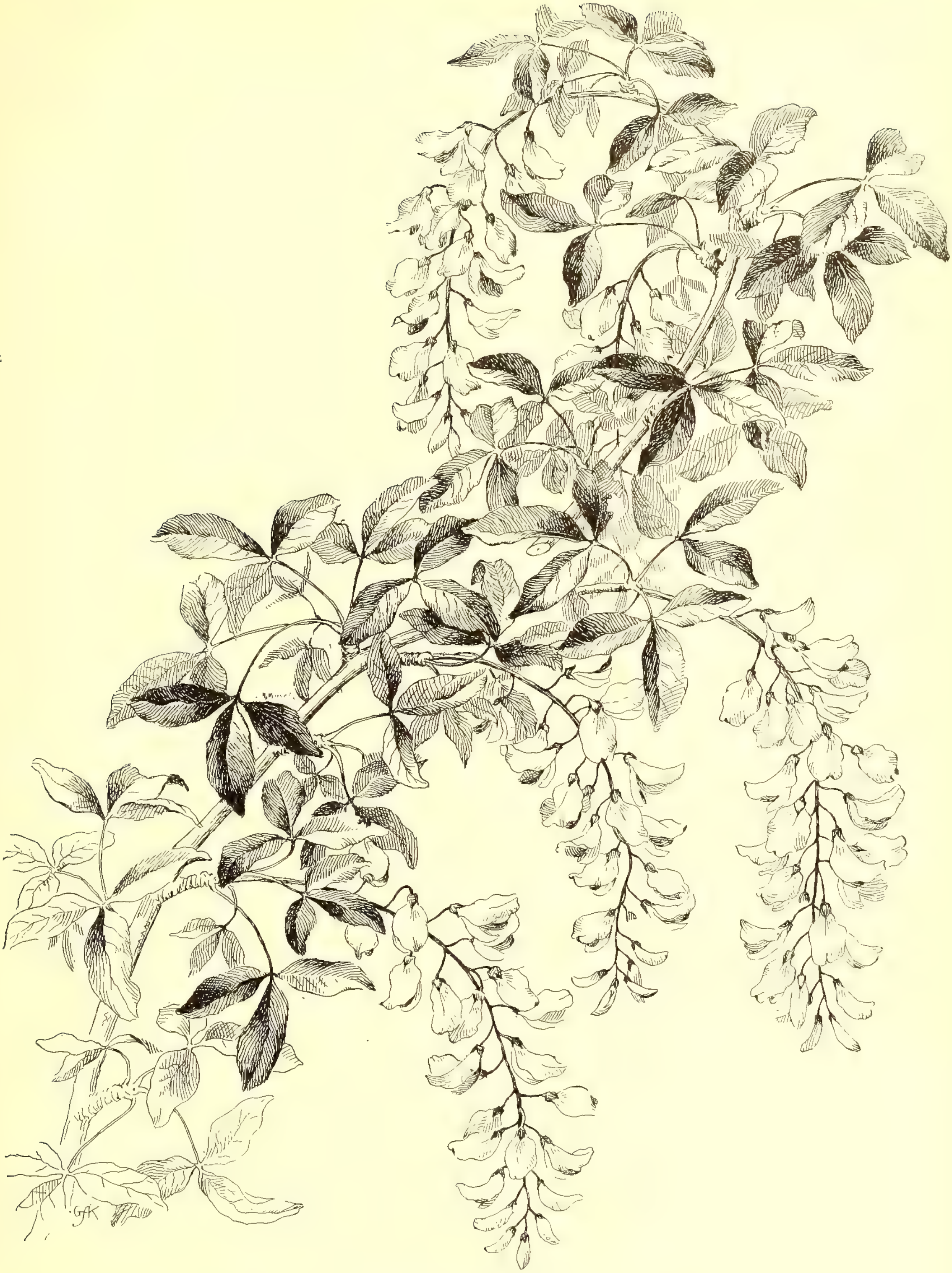


THE CLIMBING plants have a place of their own in garden decoration, a place that cannot at all be filled by any other plants. Screens are necessary for the veranda or for covering out-buildings, and when wanted something of an ornamental character is desirable. It is a well known fact that the plant foliage is the most cooling shade that can be devised, and it also furnishes a rest to the eye and mind. An awning will keep the sun from our rooms or from the veranda, but it does not furnish a cooling, refreshing shade, as does the foliage of our climbing plants.

Nature seems to have provided climbing plants for this very purpose, and in the greatest profusion where they are the most needed. The most vigorous and beautiful in the world are indigenous in the woods of nearly all our states, growing to the summits of lofty trees, covering walls and fences in the most artistic manner, and creeping over and among rocks where but little other vegetation will thrive. The different sorts of vines may be distinguished as creepers, twiners, climbers and trailers. The creepers are those that throw out adventitious roots from their stems as they climb, by which they attach themselves to the bark of trees and rough walls, like the Virginia creeper and English ivy. Twiners, of which the honeysuckle is the best example, rise by winding round and round objects with which they come in contact. Climbers rise by their tendrils laying hold of twigs of trees, or fixing themselves in crevices and supporting the vine till its large arms have wreathed themselves upon some other support—a grape vine, for instance, or if they are without tendrils, they rise by the mere force of their growth overlaying the branches of trees, and finding support by hanging over them, like the wild roses. Trailers, are those that prefer to creep upon the ground, like the low vine blackberry. Prominent among our native creepers is the well known

VIRGINIA CREEPER (*Ampelopsis quinquefolia*), often callled the American ivy, though it has but little resemblance to the true ivy, except in its power of adhesion to the bark of trees and to walls, and in the fact that it forms an equally luxuriant mass of foliage upon them. In a deep, rich soil this plant is of very rapid growth, attaching itself firmly to wood or stone buildings, or to the trunks of old trees, and it soon covers these objects with a fine mantle of rich foliage. In very rich soil, where there is sufficient moisture, it has but little resembance to the plant we are accustomed to see. In such a situation the leaves are very large and of a deep glossy green, and of very great substance. Nothing can be more admirably adapted for concealing out-buildings and disguising the unsightly stone-fences which are so common and so great a deformity in many parts of the country. Its great beauty is in autumn, when its scarlet and orange foliage is so brilliant and contrasts so finely with the cedar on which it naturally climbs.

A. tricuspidata, known to the trade as *Ampelopsis Veitchii*, and popularly as Boston ivy, a native of Japan, is a very beautiful species, more compact in habit than the foregoing, and with very bright, dark foliage, flushed with red in summer, changing to brilliant crimson in autumn. It is an elegant miniature creeper, and, like our native species, will endure and thrive well in the smoke and dust so common in many of our cities. It clings so closely by its suckers that when once started against a wall no further attention will be required to keep it in position; and left to itself, it will cover any surface



A Prince of Climbing Plants: Wistaria Sinensis.

quite as evenly and regularly as though it had had artificial training.

Ampelopsis bipinnata, commonly known as pepper vine, and as *Vitis bipinnata*, by Torrey and Gray, a native species, common in West Virginia, Ohio and southward, is a free-growing hardy climbing plant, of very graceful habit and beautiful foliage differing from all the others of its class by reason of its much divided leaves, blue green color, and free habit with moderate growth. When properly trained, a plant viewed from a distance might be mistaken for a gigantic *Lygodium scandens*. To cover a veranda it is by far the most desirable of the species.

AKEBIA QUINATA, a neat Japanese climber, is a hardy vine of delicate appearance, rapid growth, and suitable for large arbors or trellises, in sunny or shady situations. It will twine around old trees, completely covering the branches, from which it will hang in graceful festoons. It is one of our earliest flowering climbers; the flowers are produced in clusters, of a dark purplish-brown color, and are very sweet-scented. In a light, rich soil, it will grow to the height of 40 feet, and a growth of 15 feet in a single season is quite common.

ARISTOLOCHIA SIPHO, or the Dutchman's Pipe, is one of our most beautiful native climbing plants. In habit, it is both a climber and twiner, and is, therefore, unsuited for walls; but its great heart-shaped leaves, from seven to twelve inches in diameter, borne with tropical luxuriance, make a finer exhibition of massive foliage for covering verandas, trellises or other artificial constructions than anything else we know of. Not only is the foliage large, clean and perfectly healthy, but it is entirely free from insect enemies of all kinds—a consideration of great importance in selecting plants for arbors or verandas. Its flowers are extremely curious, being the shape of a siphon or hook, with a long, pendent pouch, of a yellowish-brown color, borne in May or June. It is indigenous in the Middle States, climbing to the tops of the tallest trees. For its perfect development, it should have a deep, rich soil and a moist situation. It grows equally well either in sun or shade.

THE WISTARIA.—Not the least pleasingly ornamental of this class of plants is the wistaria. While *W. frutescens*, with its lilac flowers in elegant racemes, is an old garden favorite in this country, *W. sinensis* is the finest and most popular of the genus in European gardens, and has become a good deal of a favorite in this country also. The typical form has pale purple flowers; but there is also a pure white variety of great beauty, and another very fine sort called *W. macrobotrys*, remarkable for its very long racemes. For arbors, trellises and pagodas, *W. sinensis* is a very handsome ornamental plant, and in southern and mild localities it may be grown as a standard on the lawn, with an open trellis or framework to support the branches. Any good rich soil is suitable for wistarias, but they prefer those that are light and warm, and delight in a sunny location.

THE COMMON TRUMPET CREEPER, *Bignonia* (*Tecocoma*) *radicans*, is a native plant of considerable beauty and usefulness. It is a true creeper, with long pinnate leaves, composed of from seven to eleven leaflets. It adheres to the bark of trees and to walls with the same tenacity as the Virginia Creeper, and its growth is equally vigorous; but its vigor tends more to the top, so that the trunk and branches become bare with age. The leaves appear late in the spring, and are not brilliant in autumn. Its magnificent trumpet-shaped flowers are from three to four inches in length, born in immense clusters in August and September, and are a lively orange color. This plant is not fitted for small grounds, its home being by the roadside, or on old trees, or in groves that are not in themselves particularly pleasing.

C. L. ALLEN.

PROTECTING THE FORESTS.

During the eighth annual meeting of the American Forestry Congress (now The American Forestry Association, a most decided improvement) held in Philadelphia last October, resolutions were adopted by which the Association voted to petition Congress to pass an act withdrawing from sale the forest lands of the public domain until a commission, appointed by the president, shall have made the necessary examination and reported to Congress what portion of the lands shall be kept permanently in forests.

The resolution also asks that the army be employed to protect the forests until the commission referred to shall have reported. It is surprising to note that this question excited opposition, while perhaps other plans might have been introduced which would have better accomplished the ends in view. The step taken has the virtue of bringing the power and wealth of the National Government to bear on the carrying out of the proposed reform in a most substantial manner.

This in realty is the first concentrated movement toward reform in this direction, and should be forced to a successful issue.

EARLY CHRYSANTHEMUMS.

SUMMER is the time of the rose, and the chrysanthemum is the leader among autumn flowers, scarcely less popular than the "queen" herself. Some varieties produce flowers so regular that it is not in the power of art to improve their symmetry; while others, again, have flowers that appear to be so ragged, torn and twisted that we are amazed when we behold them, and the eye is dazzled when it tries to take in the glorious tints and colors that are produced when a number of the plants are grouped together. Many people cannot spare the room for the tall plants that are generally seen at the shows, and others who would like to try their hands are at once deterred by the amount of skill, as well as room, that the plants apparently require to attain perfection. Yet the chrysanthemum is is one of the easiest plants to grow, and it requires only the same amount of care that is bestowed upon a geranium or a fuchsia to produce creditable specimens. For those who have only a very small greenhouse, or no greenhouse at all, the early flowering varieties are the best to take up, as these will be the most likely to reward them for their trouble and to induce them to continue to grow these exquisite gems. The plants should be obtained about the latter part of May or early in June, when all danger of frost is passed, and if they have been hardened by the salesman they may be placed out-of-doors at once. They may now be obtained from nurserymen and florists at trifling cost. No gardener who delights in a beautiful conservatory can afford to be without a few of the early flowering section, as they have a charming effect when placed among other plants, and where large quantities of cut flowers, and especially the white kinds, are required during September and October, the early-flowering chrysanthemums become indispensable.

Those who have the means to house the plants and to grow them on during the winter months should select their cuttings in December or January, if large plants are required. I have grown fine decorative plants from cuttings taken in March. They should be stuck in small pots containing a rather sandy loam; a quarter of an inch of sand should be put on top of the soil and the cutting be set in it. When the plants are nicely rooted, they should be potted singly into three-inch pots and then set on a shelf near the glass to prevent them from being drawn. In March, or the beginning of April, they should be shifted into six-inch pots, where they can remain until potted into their blooming pots about the first part or middle of June. They will thrive in a soil composed of loam and decayed manure. To every five barrowfuls of loam add one of manure, one of leaf mold, and sufficient sand to render the compost porous. To every barrowful add a nine-inch pot of bone-dust. For the final shift, nine-inch pots will be large enough; they must be well drained, as the plants will require large supplies of water. When potted, stand them on a bed of ashes in a sunny position. In and around the pots stakes should be inserted, to which the limbs are to be tied as they grow. If the plants are syringed every sunny afternoon there will not be much trouble with the green fly.

To secure a good, bushy plant, it is necessary to pinch the young plant when it has attained the height of about six inches; this will cause four or five shoots to break, which must be pinched when they have grown about four inches, and pinching should continue until the end of May or the first week in June, when the plants should be stopped for the last time. They may be planted out in the garden during the summer, and potted up and taken in before frost comes. All potted plants must be under cover by the end of September. In the Southern States the early-flowering varieties will succeed out of doors to perfection, but the large-flowered and later kinds will need protection. The chrysanthemum requires abundant supplies of water, and if it is allowed to suffer from drought the leaves will turn yellow and the flowers will be deformed. As soon as the roots reach the sides of the blooming pots weak liquid stimulants may be used; but too much must not be given. After the flower buds are formed, the liquid manure may be given more frequently. It is well to have several kinds on hand and to change them occasionally. The flowers will be much improved if the buds are thinned a little. The early-flowering varieties often produce buds in great quantities, so that one need not feel at all loath to remove a few.

The following list contains, I believe, the cream of the early-flowering section. It will be observed that many of them are pompones. La Vierge, pure white; A. Dufour, purple violet; Soeur Melanie, white; William Holmes, crimson; Model, white; Madame Desgrange, G. Wermig, La Neige, Lady Selborne, white; Bolede, Golden George Glenny, Mrs. George Rundle, white; L'Or du Rhin, yellow; Antonelli, bronze with orange tip; Cullingfordi, crimson; Tynaert Van Geert, yellow and orange; Prince of Wales, purplish; Lady Hardinge, rose; La Petite Marie, pure white; Early Blush, rosy blush; Lyon, rosy red; Golden Fleece; M. M. Paul et fils, golden yellow; Nanum, creamy white; Anastasia, magenta; A. Villotte des Prugnes, Mons. John Laing, Alice Butcher, Mandarin, M. Van Halle, Flora, yellow; Henderson et fils, yellow; Illustration, blush; Fleur d' Eté; W. Cobbet; Pomponium; C. J. Quintus; Canary; Inimitable, orange red; Early Cassy, lilac and gold; Venus, lilac; Hettie Barker, blush; Aurea Multiflora, yellow; Beverley, button; Cedo Nulli, lilac; Brown Cedo Nulli; Golden Cedo Nulli; White Trevenna; Golden Trevenna; Lilac Gem; President, deep rose; Beethoven, bronzy red; Solomon, dark rose; Brilliant, crimson; Jersey Beauty, yellow; Surprise; La Bien Amie; Golden Madame Domage; James Salter; Simon Delaux, crimson; Blanc Précoce, white; Madame Hoste, rosy salmon; Mrs. J. Pitcher, blush; Madame Jolivart, blush; Isidore Feral, rosy lilac with yellow center; Rose d' Eté; Mrs. Wood, bronze yellow; Toreador, bronzy red; Précoité, yellow; Elaine, white; Roi des Précoces, crimson; Blushing Bride, rosy lilac; Hybrid Pompon; Aigle d'Or, yellow; J. Mahood, gold color; Bouquet Æstival, light purple; Chrome Stella; Souvenir du Mons. Rampont; Mr. W. Tiercy; Monsieur Roux; Madame Piccol; Frederic Pile; Fiberta; Trésorier Lacosta.

Above list gives a wide range.

Louisiana. H. W. SMITH.

AN AMATEUR'S PLAN FOR RAISING TUBEROSES.

I have just laid down a copy of a western agricultural paper in which I read: "A tuberose bulb will not bloom a second season." While this is unquestionably true, such statements often mislead many persons who get from them the idea that new bulbs must be bought from the florist every year, as though their culture were peculiar or difficult. When the bulb in the garden has ceased blooming, and before severe frosts have come, dig it up and remove the cluster of small bulbs which surround it. In the spring these little bulbs should be planted in rows in rich but not too heavy soil. They may be planted about three inches apart in rows a foot apart. Give them clean, careful culture and dig them in the fall, befork there is danger from frosts, though a light frost does not injure them. Spread them out in some place where they will not get chilled, and let them dry till the adhering soil will rattle off easily. Then clip off the leaves with a pair of shears and remove the small bulbs from the larger central one. The best of the former should be preserved for a succession. The bulbs usually need two summers of careful cultivation before they are large enough to bloom. I keep mine in the drawer of a stand near the coal stove; they never get cold or damp.

The third spring most of the bulbs should be be ready for flowering, and they should be started in the house or hot-bed, as they need a long season. Give each a six-inch pot and start them from March first to April first, in order to have a succession of bloom. They should not be put into the open ground until all danger from frost is over and the ground is warm. From the time they are potted they need warmth and moisture. To have them in perfection the earth should never become dry. During drought in the summer I dig a little trench around each plant and pour into it a generous pail of water, letting it soak into the earth. When the water has disappeared the dry soil should be drawn back into the trench. Such a watering will last for several days.

Tuberoses have but few enemies. They endure but little cold, and the bulbs will mildew when stored, if not perfectly dry; but insects do them very little injury. I find it easier to cultivate them than many flowers which are far more common, while their exquisite beauty and rich perfume amply repay one for the labor bestowed upon them, as anyone will find who will make trial.

S. A. LITTLE.

FERTILIZERS FOR THE GARDEN—VII.

RURAL NEW-YORKER says: "It is much to be regretted that certain writers are advocating the use of nitrate of soda. Unless the land is well supplied with potash and phosphoric acid and needs nitrogen alone, nitrogen will not materially increase the crop." This is a self-evident proposition. And the same thing might be said of soda, lime, magnesia, sulphuric acid and iron. All these ingredients of plants are absolutely essential to healthy plant growth.

There are people who contend that to maintain the productiveness of our land it is necessary to return to the soil the amount of plant food that the crops remove. They overlook the fact that a certain amount of plant food is rendered available each year from the store of plant food lying dormant in the soil. If this is sufficient we need use no manure. If any one element is deficient, we must supply the deficiency or be satisfied with a deficient yield. The weakest link in a chain determines the strength of the whole chain. If we find out the weakest link and strengthen it, then some other link would be the weakest. As a rule, for most garden crops, our soils are deficient, 1st, in nitrogen; and when this is supplied, they are deficient, 2nd, in phosphoric acid; and when this is supplied, they are deficient, 3rd, in potash, and so on through every link in the chain.

For forty years or more, efforts have been made to find out what ingredients of plant food are most likely to be deficient. It was proposed to analyze the soils. This was found to be practically useless. The idea was then advanced that the amount of plant food in the crops would tell us the amount necessary to apply in manure. Lawes and Gilbert's experiments, over forty years ago, demonstrated the fallacy of this idea, but every now and then it shoots up again and grows as vigorously and perniciously as ever.

As we said last month, what we need, especially for garden crops, is not "soil tests," but experiments that will show what plants require a "sap of the soil" specially rich in nitrogen or in phosphoric acid or potash. In other words, we want to ascertain the weakest link in the supply of food for different plants; and there is no way of getting at the facts except by actual experiments.

When the editor of the *Rural* says it is much to be regretted that we are advocating the use of nitrate of soda, he overlooks the fact that we advocate the use of superphosphate with equal earnestness, and, in some cases, of potash also. The object of these articles was to show that when gardeners use the ordinary commercial fertilizers, they spend a great deal of money for plant food that their crops do not need. For instance, if they want to apply 100 pounds of nitrogen on an acre of land, and 50 pounds of phosphoric acid, and buy a fertilizer guaranteed to contain 2 per cent. of nitrogen and 12 per cent. of phosphoric acid, they will have to sow 5000 pounds to the acre, and this will furnish *twelve times* as much phosphoric acid as is required. What we contend for is that they should buy the necessary phosphoric acid in the cheapest and best form and be sure to use enough of it, but not too much. To put on twelve times as much soluble phosphoric acid as is needed, in order to get the necessary nitrogen, is folly. If you want nitrogen as well as phosphoric acid, buy the nitrogen in the cheapest and best form. If we recommend nitrate of soda to those who wish to buy nitrogen, it is because the nitrogen is in the best and most available form, and because, at the present time, it is the cheapest source of nitrogen.

There are enormous beds of it in South America, and its use in Europe is rapidly increasing, while with us, it is almost unknown. It certainly is well worth our while to see if, especially in our dry and sunny climate, we cannot use it to great advantage.

The editor of the *Rural New-Yorker* further says: "In experiments made at the *Rural* grounds during two seasons, to ascertain the effects of nitrogen on potatoes, it was found that additional quantities of nitrate of soda or sulphate of ammonia or blood, or all three, beyond what was supplied by the 'complete' fertilizer, did not increase the yield in any case. * * * From 1,200 to 2,000 pounds of the fertilizer was used, guaranteed to contain 3½ per cent. of nitrogen, 12 per cent. of phosphoric acid and 6 per cent. of potash. It appears, therefore, that the amount of nitrogen supplied by the fertilizer was amply sufficient for the crop's needs, and that the added nitrogen was so much money thrown away."

Mr. Carman, the able editor of the *Rural New-Yorker*, made better experiments than his allusion to them above would indicate. Our own personal objection to them is that they were on too small a scale to carry conviction to an old farmer and gardener. The plots were only $\frac{1}{440}$ part of an acre each. One good feature, however, was that four plots were left without manure. These plots produced at the rate of 88, 97, 68 and 59 bushels per acre each. The variation in the land, therefore, was 38 bushels per acre. Bearing this fact in mind, let us look at some of the more important results bearing on the subject we are discussing.

RESULTS OF EXPERIMENTS ON POTATOES, BY E. S. CARMAN, EDITOR RURAL NEW-YORKER.

	Bushels per acre.
1—No manure (average 4 plots)	74
2—300 pounds sulphate of potash	95
3—400 pounds superphosphate	103
4—200 pounds nitrate of soda	141
5—1100 pounds blood, nitrate of soda and sulphate of ammonia	183
6—10 tons two year-old farm manure	139
7—200 pounds nitrate of soda 120 pounds muriate of potash	139
8—200 pounds nitrate of soda 120 pounds muriate of potash 700 pounds superphosphate	156

There is certainly nothing in these results contradictory to the principles we have advocated in THE AMERICAN GARDEN. Mr. Carman states that the soil had been cropped for many years without manure of any kind, and that it "would not grow beans, or even a good crop of weeds without manure." And yet it will be seen that nitrogen *alone*, on plot 5, produced 183 bushels of potatoes per acre, while on plot 8, 1,020 pounds of a "complete manure" produced only 156 bushels, or 27 bushels less than nitrogen alone. Why is this? Did the phosphoric acid and potash do harm? No; there was not nitrogen enough. The phosphoric acid and potash could not increase the crop for lack of nitrogen.

Mr. Carman tells us that he used from 1200 to 2,000 pounds of a complete fertilizer, guaranteed to contain 3½ per cent. of nitrogen, 12 per cent. phosphoric acid and 6 per cent of potash, and that when he added *more nitrogen*, it did no good. Why should it? Oats are good for horses, but when a horse has all the oats he will eat, throwing more oats into the manger will not increase his strength or improve his appearance. If the ton of complete fertilizer furnished all the nitrogen the plants wanted, more could do no good. But for the sake of getting 70 pounds of nitrogen, what folly it is to use a ton of fertilizer that contains a great deal more phosphoric acid, costing 8 cents per lb., than the crop can possibly want? This is the point we wish to impress on our readers. And it is a matter of surprise that so clear-headed and able a man as Mr. Carman does not see that his own experiments demonstrate, if they demonstrate anything, that, so far as the production of potatoes is concerned, this worn out soil, that was so poor that it would not grow a good crop of weeds, was more deficient in available nitrogen than in any other constituent of plant-food. Superphosphate and potash, without nitrogen, did no good. They could produce no effect from lack of nitrogen. Thirty-two pounds of nitrogen per acre, in the form of nitrate of soda, raised the crop from 74 bushels per acre (or possibly 59 bushels) to 141 bushels per acre. The same amount of nitrogen on plot 8, in 1,020 lbs of "complete manure" produced 156 bushels, the 820 lbs. of superphosphate and potash only increasing the yield 15 bushels per acre, —not as much as the difference in yield of the unmanured plots. Nitrogen alone, on plot 5, produced 183 bushels per acre. It is clear, therefore, that a complete manure, like that used on plot 8, containing about 3¼ per cent, of nitrogen is a very costly and "badly balanced ration" for potatoes. It does not, for Mr. Carman's poor, worn out soil, contain half nitrogen enough. It is true that by using enough of it you could grow a large crop, but it would be done at a fearful and unnecessary expense. We feel perfectly safe in saying that a ton of it per acre would produce no larger a crop than half a ton that contained double the amount of nitrogen.

A complete manure, such as that used on plot 8, would probably cost $40 per ton. The 200 lbs. of nitrate of soda in the mixture can be bought for $5. In other words, the phosphoric acid and potash in the ton of this complete manure cost $35. Leave half of it out and double the nitrate and you will, in our judgement, get quite as large a crop at far less cost. There is nothing in Mr. Carman's experiments, or any other, to lead us to suppose otherwise.

Moreton Farm. JOSEPH HARRIS.

DEVELOPMENT OF THE CABBAGE.

No vegetable in the entire list so stubbornly resists our effort for its improvement as does the cabbage. Experience and observation lead me to believe that were careless methods adapted in the propagation of this vegetable by seed-growers, it would so rapidly degenerate as to soon lose its valuable characteristics.

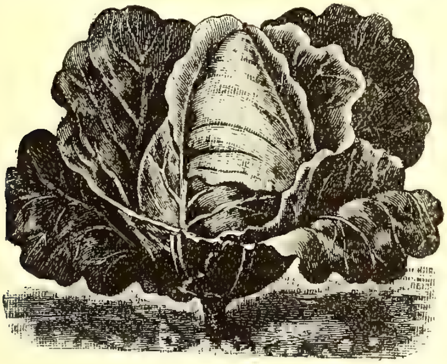


FIG. I. JERSEY WAKEFIELD.

The refuse cabbage left in our fields will survive mild winters, and if allowed to do so, will spring up and bear seed, which, in turn, will grow cabbages. In this way we have noted that the cabbage gains rapidly in hardiness and loses equally as rapidly its heading capacity. There is little doubt that if this manner of production were allowed to continue through a series of years, that the cabbage would soon lose its valuable properties and become little better than a noxious weed.

Intelligent effort has, in the past few years, made excellent progress in the improvement of the cabbage, but no one will reach satisfactory results in the direction of its development, without a thorough understanding of the whole subject. Selection must be made with reference to the entire plant, and every minor point must also be considered.

Selection with reference to the head only, as it is frequently made, while it will undoubtedly produce a strain very reliable in heading, can never reach the best results; because the head, while it is perhaps the most important feature, is by no means the only one to be taken into consideration.

In order to arrive at a proper understanding of this subject, let us divide the cabbage family into three classes, having reference only to their season of maturity—the early, intermediate and late.

In an early sort we require not only earliness, but reliability in heading, close habit of growth, and hardiness. The Jersey Wakefield, to my mind, still combines more valuable characteristics than any other early variety. The development of recent years has gone a great way toward eliminating the flat heads which used to be so prevalent in this variety, and in the best strains of to-day the conical type is very well fixed.

In our selection we will first look at the head. This should be a well-shaped pointed cone, the largest points of circumference being as low down as possible. The point of the head, though decided, should not be sharp; let it gain size from its width rather than from its length. Great care should be taken that the leaves forming the head should lap *across* and *over* the point and as far as possible on the other side, for here lies the secret of that solidity which is one of its most valuable features. It should not be too large, for experience proves that extreme size and extreme earliness are directly opposed to one another; what we gain in one direction we shall be likely to lose in the other.

The leaves should be broad and smooth, with ribs running well down and joining the midrib near the base of the leaf. A most important feature is their thick leathery texture, for here we secure that hardiness so important in a cabbage so largely wintered over in the gardener's cold frames. This feature should, therefore, be encouraged to the utmost.

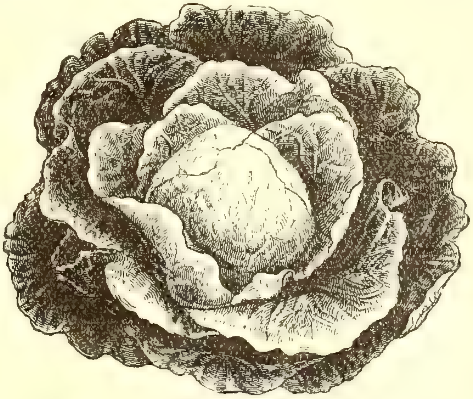


FIG. 2. A POOR JERSEY WAKEFIELD.

The stalk is short and not very large. This and the root should show no sign of disease. These

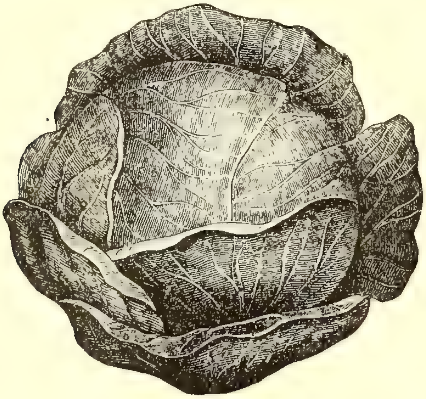


FIG. 3. EARLY SUMMER.

points, together with that close habit of growth so desirable in all early cabbages where planting thickly is an important consideration, and a dark healthy color of foliage, which speaks of strong vigorous constitution, should be possessed by the typical early cabbage; and if a number be selected with the idea of improving a strain, they should, if possible, be uniform to the minutest detail.

In the intermediate varieties we have a number of excellent sorts representing a variety of distinct types, all of which have valuable features of their own. The time at my disposal will not admit of a consideration of varieties, and I shall confine myself to Henderson's Early Summer, a cabbage which, as improved by the work of recent years, is a most excellent second early sort. As first introduced, this variety produced a flat head, but the demand of recent years has led to the development of a rounder, deeper head, which I think preferable. The head, if the plant is mature, should be firm and solid. Tear away two or three of the leaves from the top and see that each succeeding leaf laps over and across the center. This is an important feature, and if disregarded, we should soon see a tendency to produce what are known as rosettes. We should select the largest early heads. Both size and earliness are desirable in an intermediate variety, but neither quality should be sacrificed for the other. Have the head oval across the top, but by no means pointed. The leaves are broad and smooth, and have a somewhat spoon-like form, and not as thick and leathery as the Wakefield, but are quite thick and stiff.

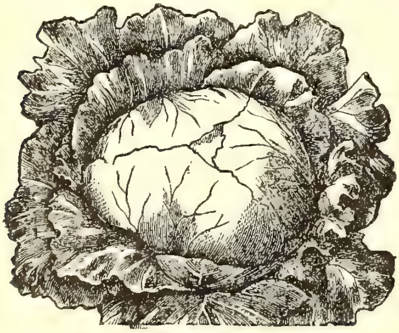


FIG. 4. A POOR EARLY SUMMER.

The best strains of this cabbage are very uniform in color, a bluish green, quite glaucous, with light veins. I have frequently noticed a tendency to a lighter shade, with a peculiar shining appearance, which is an evidence of impaired vitality, and should be carefully guarded against.

The stem is short and stocky, should have good root-hold, and the entire plant should be perfectly healthy throughout.

In the late sorts we have a long list of names to choose from, and while each has distinctive features of its own, they are, with the exception of the Savoys, closely related to each other.

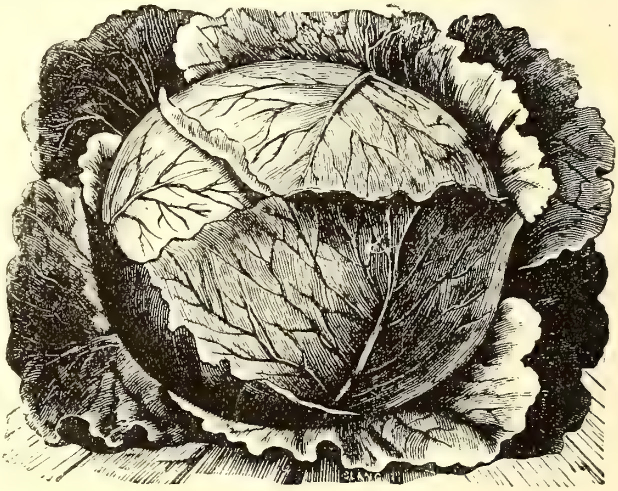


FIG. 5. FLAT DUTCH.

In considering the late cabbages, a study of the Premium Flat Dutch may not be unprofitable. We have here a large, deep, flat head, and as in the other sorts we have considered, I think care should be taken that the head should be well covered; that is, the outside leaves should lap over and across the center. There is a tendency in this and all other varieties closely related to it, to form heads whose outer leaves do not meet at the top, but roll back a little from the apex, exposing the leaves below. This is a dangerous tendency and should be carefully guarded against, as seed from such cabbage leads first to loose heads, and from them to "rosettes," or cabbage forming no heads at all.

In Premium Flat Dutch the leaves are slightly blistered and have a ruffled border. The last one, while reaching well across the center, usually curls up a trifle at the edge. They are pale green in color, a purple tinge usually appearing green in the fall.

One of the most important points to be considered is the shape of the outside leaves; they should be as broad as possible, and leaved out to their junction with the stalk, or, as botanists would say, should not be petioled.

To secure vigor and size it is best to allow an abundance of foliage, and while it is important not to depart from the prevailing color, the darker specimens should be selected. The stalk is short and very stocky.

We have described these varieties because they are well known representatives of their classes and not because of any desire to call special attention to them. Whatever strain or variety we undertake to improve, we must have in mind an ideal type and approach it as nearly as possible in every respect.

No set rules can be given for the improvement of this vegetable, because of the difference in varieties—a difference which it is desirable to maintain; but, other things bring equal, I think a short stocky stalk far preferable to a long one; that the leaves should be broad and of good healthy color, and while there a few varieties in which the leaves take the petioled form, in most of them this form of leaf should be avoided. The most dangerous tendency in the head is that which I have described in the Premium Flat Dutch, to not cover well, a fault more or less prevalent in all varieties, and one we should endeavor to eliminate. We may improve the head also in size and in earliness, but we fail in our efforts to make a variety both larger and earlier.

There is in this work much to attract every lover of the garden, but it is the work of an expert, and he who succeeds must have that thorough acquaintance with the plant which patient study and practical experience alone can give.

The six figures show fairly well the improvement made in cabbages in the past few years. The poor types, in every case, are old cuts taken from what were them considered good specimens, and the better types show fairly good specimens as they now exist. Some of these old cuts are still used by seedsmen. The better illustration of Jersey Wakefield, Fig. 1, is rather too tall and sharp. The poorer one, Fig. 2, is a poor cabbage in every respect. The better Early Summer, Fig. 3, is fairly good, but it is evident that some of the outer leaves have been removed. The poorer type, Fig. 4, shows an untrue leaf and a poor head, with the dangerous tendency of the leaves to curl up at the ends. This cut is used by a number of seedsmen to illustrate several varieties, and forcibly indicates either ignorance or deception. The better Flat shows a smooth leaf and poor head at the center. Dutch, Fig. 5, is very good. The poor one, Fig. 6,

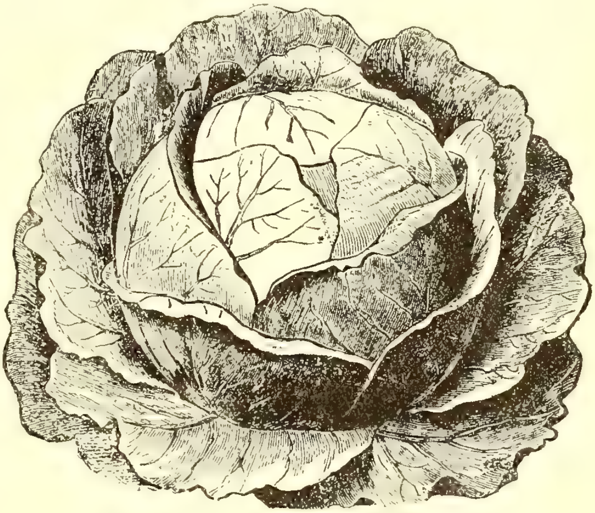


FIG. 6. FLAT DUTCH OF POOR TYPE.

Long Island. J. M. LUPTON.

SOME GOOD VARIETIES OF LETTUCE.

I judge these varieties from the standpoint of the market gardener, who has need to study the market and find out kinds most acceptable to the consumer. The things most desired are tenderness and size of head; the shape and color of leaf or head are points on which there is much difference of opinion. When these points are united in a single variety to the buyer's satisfaction, a market is secured. The keeping qualities of lettuce after pulling and ability to endure rough or distant transportation, the quality of leaf, and ability to stand summer heat and winter cold, are other qualities desired by the grower; a lettuce good for raising in hot-beds is often useless grown out doors, and an early summer lettuce is not adapted for mid-summer. The market demands a constant supply, and this is best secured by combining excellence with variety.

The first seed sown is usually White-seeded Tennis Ball

(Boston Market). This, sown in January, can be set out in hot-beds in February; in February, seed of lettuce intended for growing early out of doors is sown. For this latter sowing I use White-seeded Tennis Ball, Maule's Hanson, Burpee's Hard Head, Henderson's New York, Tomhannock, Oak-leaved. These make a good succession till July 15, by sowing the seed at short intervals within thirty days, and in the order given. Another good combination is Burpee's Hard Head, Hanson, Boston Curled, Perpetual, Burpee's Midsummer. Both these lists give texture, color, size and form in lettuce in a way to suit a variety of tastes. Another list, and a good one, is Boston Market, Deacon, Simpson, Grand Rapids, Curled India.

White-seeded Tennis Ball is good for forcing, and Grand Rapids is one of the best. In out-door culture, the Black-seeded Tennis Ball is apt to be darker leaved and poorer quality; it heads evenly and all at once, and must be cut as soon as the heads are formed, for if not, the heads open, showing the seed stalk, and are then unfit for sale. Maule's Hanson is the best strain of that variety of lettuce I have found; for two years I have had many single heads weighing three pounds apiece. It is very sure to head and has few sports, while the period of cutting extends over three weeks. Burpee's Hard Head is similar in form to Tennis Ball, but having red and green on the outer leaves, the heart being yellow; remains two weeks in condition to market, endures heat well, and is a sure header. Henderson's New York is large, strong growing, dark leaved, standing summer heat well, the leaf being rather thick and tough for an early lettuce. It has a very large head, and remains a long time fit to cut.

Tomhannock I have used for a hot weather lettuce in July, with good success. Leaves upright, tender, large, red and yellow; very satisfactory to some buyers; not a hard head. Oak-leaved is one of the best for hot weather lettuce, remaining edible for a long time, as it does not run up to seed readily; the form of the leaves is peculiar; there is no head, only compact leaves; the color is lemon yellow. Perpetual is a good tender summer lettuce, not running to seed rapidly, but having little or no head. Burpee's Midsummer is quite brown in cool spring weather, but under high summer heat it bleaches to a golden yellow heart, and makes a large good head. Deacon is a remarkably large, compact head, strong growing; fit for either spring or summer, but it is thick leaved, and consequently neglected in the market when soft-leaved or more tender lettuce is offered. Grand Rapids lettuce, after two seasons' trial, proves a good all round lettuce, growing in heat or cold, and making light colored, tender, soft heads, being specially valuable for forcing. Boston Curled, Curled India, Simpson, Hanson, are all old forms of lettuce, and are good, but are now, I believe, superseded by other kinds which are better. This list seems to me to contain all the best varieties, so far as tried. They, in turn, may be superseded by better kinds, but for this season, these will be found excellent. W. H. BULL.

Hampden Co., Mass.

EXPERIENCES WITH TOMATOES.

RESULTS OF A LARGE EXPERIMENT.

As most things can be judged only by comparison, I was led last spring to obtain all varieties of tomatoes. In many cases it was found that the so-called new varieties were only new names for old friends. After much correspondence and inquiry, there was obtained what were presumably eighty varieties. Some varieties at maturity could not be distinguished from those obtained from other parties under different names, and in many cases the fruit, when shown all together, might not be easily distinguished, but the same while growing, in habit, bearing, quality, flavor and solidity were readily separated.

My experience in growing tomatoes has been that we get the earliest fruit on light soil with but little manure; the crop will be less and sooner over, although the first few pickings for market may bring a price that will overbalance the larger crop which may be raised on heavier and highly manured soil. For marketing, two plantings are usually made, one as early as can safely be done in frames, the other in open ground. I have had success and failure by planting directly in the hill where the plants are to grow. The last way is precarious, on account of the black flea-beetle destroying the young plants, and one may lose the whole crop in a couple of hot days before he is aware the little nuisance is around.

In setting out plants, a cloudy day is preferable, when the ground is fairly damp, but not wet. Let the roots be grouted or "puddled" in a mixture of good, rich, fine dirt, stirred in water until it will adhere to the roots. It is always preferable to have the plants stocky and to transplant in the frames, but that requires room. Although some of our Station bulletins have said that a "leggy" tomato plant is of little use, I must differ from them, if I am allowed to set the plants. Such plants are not to be planted the ordinary manner, for they will surely be scalded by the first sun; but put the roots at the side of the hill and bury the stalk to the top leaves. In a few days the whole stalk will be a mass of roots, and the plant will grow vigorously and will do equally well with plants that are more stocky. To be sure, it is a little more work to set such plants, but it will pay to take a little more time if the plants have become drawn In transplanting I always use a mason's pointing-trowel. The plants are either dropped ahead of the setter or he takes a handful in his left hand. The trowel is thrust in and a pull towards the setter opens the ground; at the same time the plant is put in and a slight pressure of the foot firms the soil. With a little practice this is done very rapidly, and to me it is much better and easier than planting with a dibble.

After this digression, I will give the results of my study of varieties. There were planted the last week of March in a house that had but little heat, eighty varieties of tomatoes, a few kinds a few days later. When the first four leaves had developed, all were pricked out in plots spaced two inches apart, where they grew until the 9th of May. Two new varieties that were highly recommended were put in the same time that the others were set, in pots, to give them a better chance, and they made a little more growth. All were set on the same day, the 9th of May. The ground was slightly rolling, a sandy loam, one with sandy depression, and one quite heavy loam. The sandy depression seemed to force the fruit, and the latter to retard the ripening.

Our past summer was one of successive rains and the temperature was below the average. August was mostly dry and rather hot. That seemed to crack many varieties. September 10th was opened with a five days' rain and very high winds, blowing the plants about and whipping the leaves almost off some of them. The day before the rain a small box of each kind was secured, and placed on shelves in the barn to try their staying qualities. It is certain that with drier weather different results would have been shown. To determine the longest time fruit would keep, I should pick green fruit earlier in the season, but fruit of each lot, in this case, was as nearly alike in all respects as could be had. It is a noteworthy fact that all of the purple or Acme color were the first to rot.

Horsford's Prelude.—First blooms, June 11th. First ripe fruit, July 29th, 122 days from seed. Smooth, free from cracks, quality good; fruitful; too small for general market, but desirable as to earliness and long continuance in bearing. Kept 12 days.

Livingston's Potato Leaf.—Ripe in 134 days. Large and solid, some wrinkled, cracked and yellow at stem, badly rotted in rain; productive. Kept 5 days

Early New Jersey.—Ripe in 128 days. Bright crimson, a good bearer; large, smooth, solid, and of good quality; cracked some in rain. Kept 7 days.

Early Richmond.—Not desirable. Not early.

Improved Yellow.—Ripe in 128 days. Good bearer, holding a long time; a distinct orange color, mild and insipid flavor; no cracking. Kept 12 days.

Ivory Ball (*White Apple*).—Ripe August 9th—140 days. Small creamy white, mild flavor, great bearer and the longest keeper of all. The rains had no effect on it. Kept 34 days. Of no great value, but mentioned here because of its great staying qualities.

Extra Early Advance.—The same as Horsford's Prelude, so far as I could see.

Volunteer.—Ripe in 125 days. A heavy crop of fine, bright colored fruit; quality first-rate, solid; bore a long time, cracked a little in rain. Kept 19 days.

Peach.—Ripe in 128 days. Small fruit, borne in great abundance and a long time. Has somewhat the color and touch of the peach; flavor mild and sweetish, but no peach flavor. Of little value, except as a novelty; never cracks. Kept 14 days.

Climax.—Ripe in 125 days. Good bearer, smooth and solid; cracked but little until the long rain, when all cracked and rotted, as all of the same color did. It kept 7 days, the longest of any of its color.

Livingston's Favorite. —Ripe in 128 days. Large, fine fruit of red color, very smooth and fine; cracked a little at stem, bore a long time; among the best. Kept 8 days.

Livingston's Beauty.—Ripe in 128 days. Of good size, smooth and solid, free from cracks until the long rain, when all badly cracked and rotted. Kept 5 days.

Cardinal.—Ripe in 138 days. Good size, bears well and for a long time, stood rain good without cracks. Kept 7 days.

Acme.—Ripe in 128 days. Medium size, round, smooth and solid, yellow and hard at stem—a bad fault—and cracked badly in rain. Kept 5 days.

Trophy. —Ripe in 128 days. Large size, some wrinkled, heavy bearer, solid, free from hard core, quality good; cracked but little in rain. Kept 7 days.

Matchless.—Ripe in 128 days. Good crop, bright red, solid, good quality, stood rain well. Kept 14 days.

Paragon.—Ripe in 131 days. Had black rot before ripe; bright red, solid and smooth, productive and long in bearing, free from cracks in rain. Kept 9 days.

Lorillard.—Ripe in 128 days. Good size, bright, glossy red, smooth and solid, good in quality, good bearer, picking a long time; cracked a little in the long rain. Kept 15 days.

Dwarf Champion.—Ripe in 138 days, not keeping its reputation for earliness. Fruit similar to Acme in size and color; shy bearer, badly cracked. Kept 6 days.

French Tree (*Upright*).—Ripe in 155 days. No good.

Station.—Ripe in 115 days. This is a cross of the Alpha and French Tree, grown by Mr. Goff at the New York State Experiment Station several years ago. It was the first to ripen of all I had; of medium size, round, smooth and solid, of good flavor; cracked some at stem, was free from rot, has very few seeds—one of good size counting only fifty-five. Some of the plants were literally covered with fruit, it standing along the stem as though tied on like onions. The plant has the habit of its parent, "The Tree," in no other respect resembling it, however, as it was first early. When killed by frost, it was still full of green and ripe fruit. It would seem to be good for greenhouses, although I have not tried it there. I would not recommend it for general crop; still I think it may become a favorite in small gardens and for its earliness. It may be found not to ripen as fast as some varieties, but its earliness and good quality will make amends for that. In small gardens it may be planted only 2½ feet apart.

Puritan.—Ripe in 134 days. Large, smooth, well ripened at stem, bright red, quality good: large crop, lasting a long time. Kept well in rain. Kept 8 days.

Mikado.—Ripe in 130 days. Very like Turner's Hybrid, though not so smooth and not so well selected. Kept 5 days.

Shah (*White Mikado*).—Like Mikado, only light, and like all yellow sorts, very watery and thin when cooked; cracked badly. Kept 6 days.

New Jersey.—Ripe in 126 days. Very fine, large, solid, bright red, of good quality; bears well and cracked but little in rain. Kept 6 days.

Early Washington.—Ripe in 125 days. Badly wrinkled and worthless.

Hovey.—Ripe in 125 days. Bright red, smooth, solid, good. Kept 15 days.

Hundred Day.—Ripe in 129 days. Wrinkled and cracked; worthless.

Garfield.—Ripe in 134 days. Large size, smooth, fine red color, solid; light bearer, cracked in rain. Kept 7 days.

Conqueror.—Ripe in 134 days. Fair size, good quality, light bearer; cracked in rain. Kept 19 days.

Extra Early Advance.—Ripe in 126 days. Medium size, medium quality, wrinkled, good crop; rotted in rain. Kept 7 days.

Early Conqueror.—Like Canada Victor in all respects.

Canada Victor.—Ripe in 125 days. Gave a moderate crop of somewhat wrinkled fruit, of good size; rotted badly in rain. Kept 6 days.

Essex Hybrid.—Ripe in 141 days. Large, smooth, solid, bright red, good crop and long continued; cracked but little in rain. Kept 7 days.

New Queen.—Ripe in 130 days. Fair size, smooth and solid, fine red color, large crop, long time in bearing, cracked but little in rain. Kept 5 days.

Hathaway's Excelsior.—Ripe in 128 days. Medium size, rather rough, bright red; did not rot much in rain. Kept 5 days.

Cook's Favorite.—Ripe in 131 days. Good crop, smooth, fairly solid, well ripened at stem, though cracked in rain. Kept 21 days.

Jubilee.—Ripe in 128 days. Large, wrinkled, yellow, very acid for its color, not equal to Golden Trophy in any way; cracked much, and rotted in rain. Kept 5 days.

Golden Trophy.—Ripe in 126 days. By far the best and most solid yellow sort grown; light yellow, with slight blush on some fruits. Kept 5 days.

Extra Early Cluster.—Ripe in 124 days. Good crop, bright red, somewhat wrinkled; stood rain well. Kept 18 days.

Winter Improved Tree.—Ripened with Dwarf Champion, which it resembles in growth, but gave a larger crop of fine, smooth, Acme-colored fruit; solid and good, like all the color. Did not keep well.

Finch's Essex Hybrid.—This is an improvement on Essex Hybrid in bearing and size; fruit large, bright red, well ripened at stem, and solid; cracked but little in rain. Kept 19 days.

One tomato on my list deserves more than a passing notice, being so much in advance of any grown that, with the reader's indulgence and an apology for seeming to press a new or good thing, I propose to describe from facts, as I have done with the others, the Ignotum. The Ignotum ripened in 116 days from seed, and kept 18 days in the trial with the rest. It was a sport from a German variety grown by Prof. L. H. Bailey, now of the Cornell Experiment Station, and by him distributed in small lots to test. I was fortunate to get from him seed from which I raised twenty-three plants. It was second earliest, and should be placed at the head of the list for all purposes, family, market or canning. It is a large, bright scarlet, very solid and mealy, free from hard core, of best flavor for eating raw on table. It is a very heavy tomato, although I do not consider weight a true test of a tomato's merit. Water is heavy, and very many tomatoes when cooked are but little else than water; but not so with this one. As soon as done it is very thick, as was proved in several instances when tested with other good kinds, and it was thicker when "done" than others were after two hours' evaporating. The season was the longest of any grown, being from July 24th until October 12th, when the vines were killed by frost, though still loaded with fruit in all stages. This is a record to be admired.

The Cornell Bulletin for October says: "It is by far the finest market tomato which we have ever grown. Its particular points of superiority are its large size, regularity of shape, solidity, productiveness and uniformity throughout the season. It is the largest and heaviest of the perfectly regular tomatoes and the most solid of any of the market sorts. The pickings from our patches this year were usually fit for the market as they came from the vines; and the last picking, October 10th, after a long season, was scarcely inferior to the best picking of the season." Mine certainly doubled the Cornell plants in yield and size, fruits in pickings averaging one pound each. Every market gardener on seeing them was anxious to be booked for seed, so impressed were they by the beauty of the fruit. It may be expected that this variety will be widely distributed.

As a summary of my experiment, I would recommend for either family or market use the following, in the order named:

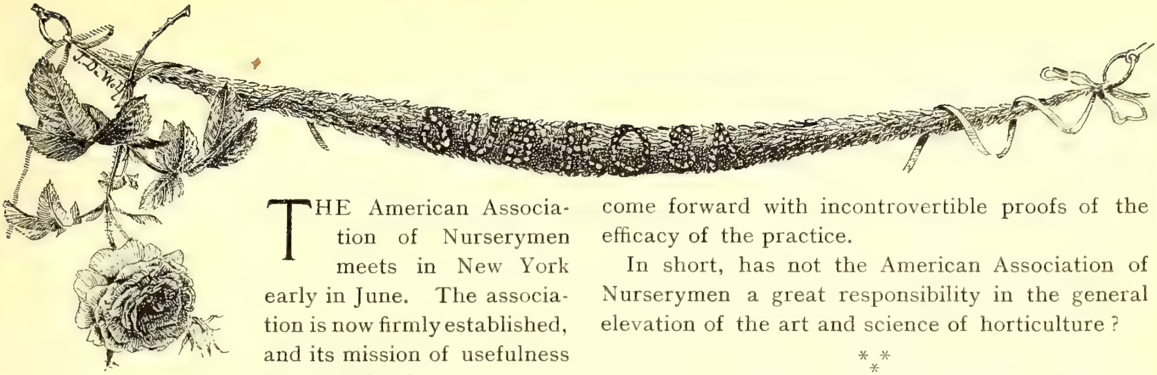
For Family.—Ignotum, Horsford's Prelude, Station.

Market: Red.—Ignotum, Volunteer, Livingston's Favorite, Matchless, New Jersey, Paragon, Lorillard, Finch's Essex Hybrid. *Purple,* Acme, Turner's Hybrid, Livingston's Potato Leaf, Livingston's Beauty, Climax. *Yellow,* Golden Trophy, Golden Queen.

For my own growing, I should strike from this list the last sixteen named and think I had enough; growing so many varieties has only confirmed my impressions in respect to the uselessness of their multiplication.

Long Island. N. HALLOCK.

[Mr. Hallock's experiments, the results of which are above first presented, are worthy careful study. The collection was shown at a New York seed store when in perfection, and attracted a great amount of attention and comment.—ED. AM. GARDEN.]



THE American Association of Nurserymen meets in New York early in June. The association is now firmly established, and its mission of usefulness is assured. It seems to us pertinent to suggest that the time has come when the association should widen its policy somewhat, and discuss more matters of general horticultural interest. We do not mean that it should invite to membership horticulturists in general, for it must still maintain its particular and special work; but it should fall in with the progress of the time in a desire to aid in the general elevation of horticulture; and it is hardly necessary to add that such breadth of view would at once advertise the association and its members. The fact is, there is a general and often strong feeling that nurserymen are too little concerned in the welfare of the planter after the bill of plants is sold, and the impression is by no means rare that they are, as a class, unreliable. These unfortunate and unfounded suspicions have arisen largely from the fact that nurserymen have been too seclusive, have not taken a sufficiently active part in the horticultural societies and in the discussion of current topics. The nurserymen and the planters are too widely separated for the mutual good.

But let their national association put itself in line with general discussion and progress, and a powerful reactionary movement will begin. Why cannot the association, for instance, do something as a body towards popularizing the movement for reform in the names of fruits and trees? Why can it not advise nurserymen to use the names of fruits promulgated by the American Pomological Society? And why can it not urge or adopt reformation in the abominable and nonsensical names of ornamental trees and shrubs?

Why can it not discuss in a broader spirit the art and science of the growing of young trees? Why can it not give us most valuable information concerning the influences of soils, fertilizers, methods of culture, methods of propagation and climate upon stocks? In a time like the present, when the value of grafting and budding is so much discussed, and when foreign journals are questioning the very utility of the practice, an association like this should come forward with incontrovertible proofs of the efficacy of the practice.

In short, has not the American Association of Nurserymen a great responsibility in the general elevation of the art and science of horticulture?

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DON'T deprive yourself and family of fruits and vegetables.

Don't depend upon wild berries.

Don't depend upon the market.

Don't set aside your poorest land for the fruits and vegetables.

Don't plant in a restricted area which is closely fenced in.

Don't plant in little beds.

Don't plant in an old orchard.

Don't plant largely of anything which will demand greatest labor when other work is most pressing.

Don't get plants or seeds from neighbors who are neglectful in culture, or who do not grow the finest varieties.

Don't put great faith in novelties.

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AN International Horticultural Congress, which we urged in our last issue in connection with the World's Fair, could accomplish much for our country. Its general influence should be good, and the specific advantages would be limited only by the money at command and the abilities of those in charge. We have several important specific applications in mind, one of which refers to the collection and publication of horticultural information. The collections of fruit and fruit-products, plants and appliances would afford a great opportunity for some genius to epitomize our present knowledge and practice. An extensive and exhaustive report, a monograph, could be made upon every fruit and vegetable, and upon nearly every handicraft of horticulture, through the aid of the exhibitions, the men and the collateral evidence and suggestions which such an institution should furnish. It is the opportunity of a century.

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THE time will come when we shall breed varieties of plants, when the originator shall proceed upon known and definite lines of plant variation. This exact knowledge will be born of exact observation and experiment. For the most part, our new varieties are now obtained by chance, or at best by a most imperfect system of selection. But the close competition in the business at the present time is demanding a more perfect adaptation of plants to specific conditions, and it is pushing the seed-growers into systematic endeavors. The seed-grower must be a man of the most exact methods if he produces best plants. He must discover and analyze the minutest differences and variations in plants. These remarks are admirably illustrated in the paper on the "Development of the Cabbage," which appears in this issue, and which is written by one of the best seed-breeders in the country.

The seed-breeder looks to two general lines of effort for the production and improvement of varieties: amalgamation and selection. By crossing there is a possibility of arriving at definite ends, but our knowledge of amalgamation in plants is so slight that we cannot often use it with profit outside the field of ornamental gardening. As a matter of fact, no seed-grower employs crossing as a means of improving kitchen-garden vegetables, although much is said concerning crosses and hybrids. Some growers undoubtedly suppose that they are employing it by planting kinds near each other and hoping, or expecting, that they will intermix. But such intermixture is much less frequent than gardeners, or even experimenters, suppose; and the good results which appear to come from such methods are undoubtedly mostly produced by an unconscious selection. We have positively no knowledge as to whether or no crossing is an available means of improving cabbages, roots, potatoes, tomatoes and most other vegetables; and its influence even among squashes, melons and cucumbers is not understood.

Selection remains the important factor in improvement of plants. In fact, even when we have learned the laws of amalgamation, selection will still increase in importance as a means of securing suitable parents and of adapting plants to minor conditions of treatment and environment. We are already possessed of many principles of selection, some of which admit of safe generalization:

1. The character of the plant is more important than the character of any part of that plant. Heredity appears to lie chiefly, or wholly, in the plant as a whole, to be identified with constitution and individuality. Selecting seeds from large fruits simply is rarely, if ever, profitable, but selection from best plants gives early improvement.

2. It is important to breed for but one thing at a time. Plants rarely, if ever, vary simultaneously in two or more directions. If color is sought, breed for it; and upon the gain thus made, breed for size or other desired attribute.

3. Breed in the best localities, in those places where the desired feature is most nearly approached, or where the plant reaches its most perfect development. Most cultivated plants are in a sense cosmopolitan, but there are some, of which the cauliflower may be cited as an example, which reach perfection only in comparatively limited areas.

4. The operator must breed for a definite purpose. This may seem a truism, and yet it is undoubtedly true that few plant breeders possess a positiveness and singleness of purpose.

5. The breeder must know the points of an ideal variety. It is probably safe to say that the men are rare, even among good gardeners, who possess any adequate knowledge of the ideals in any class of vegetables. There are few who look beyond the saleableness or mere quality in any plant or product in their measure of the ideal; in fact, saleableness and quality must be closely analyzed, for they both depend upon the combination of several or many minor features. A variety may sell above every other variety and yet be far short of an ideal, even for market. But mere saleableness should never, in itself, be the measure of the ideal, even though it be held to include quality. The perfect plant in its entirety should be kept in mind. In this connection, the article on the cabbage will bear study.

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IT MAY be humiliating to New-Yorkers to lose the World's Fair, but, under the circumstances, there is some cause for congratulation on the turn affairs have taken in this city. However mortifying to our civic pride may be the pettiness and bickerings shown by some of our millionaires having the matter in charge, the tribute to landscape work shown by the outburst of feeling on the part of the public at the attempt to devote Central Park to the uses of a fair-ground, was most gratifying. It shows that people are not as indifferent as is often assumed, although long-suffering and slow to wrath. Manifold as may be the advantages of a truly great international exhibition, the loss of New York's great breathing space at a time when greater crowds would make it an additional necessity, seems to many thinking men indefensible. If the laws are changed in this instance to divert it from the great public benefit for which it was intended, what security will there be in the future, against its use for other private money-making purposes? The people have the fate and disfigurement of the City Hall Park before them, and do not seem disposed to believe the assertions that only temporary injury will ensue. It seems singular that the commissioners of the fair should so antagonize public sympathy and spirit, and jeopardize the very existence of the fair. Wherever the site may be selected between the waters of the great oceans, we trust horticulture and landscape art will be upheld, and not disfigured and ravished. We shall direct our own efforts to their advancement and honor, and believe that the majority of people are with us.

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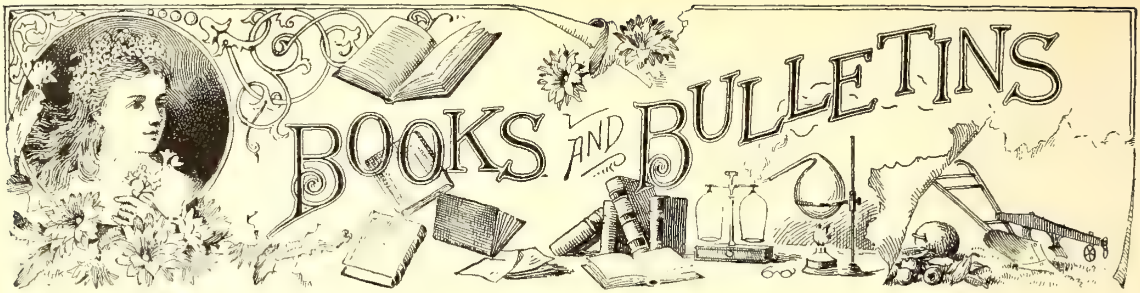
"AND THE purchase or propagation and distribution of trees, plants, shrubs, vines and cuttings shall be confined to such as are adapted to general cultivation, and to promote the general interest of horticulture and agriculture throughout the United States." Why does it happen that the clause of the national law authorizing the purchase and distribution of plants has never been acted upon? Why have the energies of the Department of Agriculture been devoted entirely to the distribution of seeds? Is it because seeds are more easily kept and handled, and are therefore handier for the use of the politician? It would seem so. Perhaps the department can exercise little influence over the two-thirds and more of its seeds which are used for political purposes, but the remaining third of its energies in this direction it should be able to control. If every administration is anxious to improve the seed-shop, why have not plants been substituted in part for seeds? To be sure, if plants were distributed upon the same basis as the seeds are, little good could be expected; but plants themselves give some indication of what they are, and the stale ones could hardly be sent out. And it is certainly true that if such an innovation were to occur in the practices of the department, people would at once suppose that reform had begun. The present evil is so thoroughly dyed into the sentiments of the people that reform must be radical if it makes any impression. It may be be said that the Division of Gardens and Grounds distributes plants. But it does so with other funds than those appropriated for the purchase of seeds and plants; and we have yet to learn that this division has made any impression upon the country.

We are confident that if the department were to follow the law, and distribute such things as are "rare and uncommon," there would be no objections on the part of seedsmen and nurserymen. Such a course would benefit these people at the same time that it might add greatly to the good of agriculture in general. We do not want the law repealed nor modified. We only want its spirit followed.

"POLITICS in horticulture," would seem an appropriate caption for an account of the controversy going on over the McKinley bill, at this writing pending in Congress. The bill provides for an increase of customs duty on certain bulbs, plants, etc., grown over the water. Among those enumerated are roses, spiræas, orchids, palms and lily of the valley. Politics crop out most strongly in the discussion of the subject in the horticultural press, and especially in the "trade" journals. On general political principles, the Republicans desire that the bill be passed, and the Democrats wish to defeat it. THE AMERICAN GARDEN is a mugwump, in so far that it desires the best thing for the greatest number, and, on those grounds it seems to us that an increase of duty on the plants, etc., named, or indeed *any* duty, is contrary to the best interests of not only the "trade," but the vast army of planters all over our country. Especially does this view of the question seem logical when it is considered that nearly all of the plants on which it is proposed to increase the duty are species which cannot be propagated with the best success in this country. It is hardly fair that we should be made to pay a premium on our love for the beauty of nature, more especially when the duty "protects" no one who needs protection, injures only those who are broad enough to spend money for beauty in flowers or plants, and adds to the troublesome "surplus" which is the nightmare of our statesmen—many of whom might want to turn the surplus toward their pockets, but for fear of the people! From a practical standpoint, we feel that the "trade" will agree with us that when the foreign-grown stock is put in competition with that of the same quality produced in our own country, the latter is given the preference by nine planters out of ten, even though the foreign-grown stock is offered at a lower price, which it is not, as a rule. Why we need protection from the products of growers with whom we are denied competition by the climatic influences of our country, is beyond our comprehension. It would seem more to the point if the tree, plant and seed trades of this country would look more to the betterment of our indigenous species, and the introduction into our country of the best species of other countries, all of which will tend toward the birth and growth of a higher horticulture. Put the question at issue fairly before the people, and the answer will be, first, no increase of duties on trees and plants, and then the advocacy of the abolition of all tariffs and entanglements which tend to hinder us in advancement toward the station in the world our nation is entitled to.



Bordeaux Mixture for Black-Rot.

Bulletin VI, Delaware Experiment Station. *The Black-Rot of Grapes. By Frederick D. Chester and M. H. Beckwith. Pp. 32. 1 colored plate.* Mr. Chester made careful tests of Bordeaux mixture in a commercial vineyard last year, with gratifying results. "Sprayed vines yielded on the average, 54.51 lbs. of grapes per standard row, unsprayed vines under this standard yielded 7.5 lbs. only; the use of the Bordeaux mixture, therefore, increased the return by more than seven fold. The total merchantable product from the sprayed vines was 2,953 lbs. Had no steps been taken to check the rot, the yield would have been reduced to one-seventh, or 422 lbs. A rough proof of the correctness of this claim is as follows: The season of 1888 was a more favorable one for grape growers than that just closed; nothing was then done to combat the black-rot, and it made such ravages in this vineyard that approximately 250 lbs. only of fruit could be marketed." Most of the vines were sprayed five times, on the following dates: May 21, June 3, June 21, July 4, July 15. The total cost of spraying, including the washing of the grapes at marketing time, was 58 cents per row of 20 vines.

Influence of Treatment upon Maturity.

It was found that the fruit upon sprayed vines ripened much earlier than that upon untreated vines, because the leaves were not killed by the fungus. "The difference between the sprayed and unsprayed halves of this row was very striking. The unsprayed half was nearly defoliated; the fruit adhering to the bare vines in an unripe condition, while upon the sprayed half the foliage was perfectly green, healthy, and of a dense growth. A letter from Mr. Anthony a few days later announced that the fruit upon the unsprayed half was picked September 9, making 11 days difference in the ripening."

Other Treatments.

Mr. Chester gives an extended description, with illustrations, of the black-rot fungus. Mr. Beckwith gives results of spraying with sulphate of copper, sulphide of potassium, eau celeste and Bordeaux mixture. Sulphate of copper applied before the leaves appeared, and sulphide of potassium exercised no influence. Results from the use of eau celeste and a later sulphate of copper applied in a spray, were indifferent. "Bordeaux mixture has awakened a feeling of confidence."

Washing Grapes.

The Bordeaux mixture often adheres to the berries at maturity, rendering them unattractive. This coating was readily removed by placing the grapes in wire baskets and dipping them in vinegar water. After dipping, the grapes are rinsed twice. The operation did not remove the bloom, nor in any way injure the fruit. "The baskets loaded with grapes were soaked for a few minutes in a solution made by mixing two quarts of cider vinegar in ten gallons of water. Most of this solution drained back into the tub when the basket was raised; nearly all that still adhered to the fruit disappeared after the first dip in pure water; on leaving the bath in the second tub of water, no trace of vinegar could be detected. A short exposure on the wire frames rendered the grapes fit for market. Three thousand pounds were treated in this manner, at an average expense of six cents per hundred pounds; at wholesale the grapes averaged five cents per pound net."

Are the Grapes Poisonous?

Analyses showed that 2½ pounds of metallic copper in a million pounds of fruit was present in grapes procured in the market. This is not enough to do any possible harm.

Strawberry Diseases.

Bulletin XIV, Cornell University Experiment Station. *Two Strawberry Diseases. By W. R. Dudley. Pp. 14. Illustrated.* This is a technical paper, dealing chiefly with some very important discoveries in the life history of the leaf-blight. The leaf-blight or "sun-burn" of strawberries is caused by a fungus, *Sphærella fragariæ.* The disease is often very injurious just before the fruit should ripen. Professor Dudley finds that the disease survives the winter in three forms. The mycelium remains in the leaves all winter and begins to grow quickly upon the advent of warm weather. Well defined disease was secured in 14 days after artificial inoculation of the leaves. "Aside from care in the selection of soil and in good cultivation, two modes of treatment will be found to repay the fruit grower. First, if the season opens unfavorably, the regular use of fungicides; second, if the fungus persists till autumn, destruction, in the following spring, of all old leaves by burning over." Sulphide of potassium and carbonate of copper, applied early in the season, are recommended.

Another disease, very similar to the former in external appearance, has also been studied. It has not been reported as injurious heretofore, although it has been known by botanists for some time. The treatment recommended for the leaf-blight may be employed.

Bulletin No. 22, Kentucky Experiment Station. *Potato Experiments. Pp. 23. Illustrated.* The tests reported in this bulletin concern methods of culture as well as merits of varieties. The trench system of planting was compared with the "usual" system, the trenches being "made eight inches deep, and manure or cotton seed hull ashes put in the bottom of the furrows and mixed with dirt; then potatoes planted and furrow filled until it was level with the surface." Comparisons were also made with plantings 14 and 20 inches apart in the row, and various methods of fertilizing and of cutting the seed were given attention. The experiments with fertilizers are particularly suggestive and timely, and they show that potash fertilizer is essential to the best potato culture. The general conclusions of the various experiments are as follows. "1. Many new varieties produced a larger yield than either the Early Rose or Burbank. Notably among the large yielders may be named the Irish Wonder, producing 389, Gen. Logan 296, Lombard 281, American Magnum Bonum 280 bushels per acre, while the Burbank and Early Rose produced respectively 209 and 184 bushels per acre. 2. The trench system of planting produced no marked effect as to the yield over the usual method of planting. The yield was greater in 48 out of 55 trials where potatoes were planted 14 inches apart in the row than where planted 20 inches. On the contrary, the proportion of large to small potatoes was in favor of the 20-inch planting. 3. Planting large whole potatoes largely increased the yield over planting potatoes cut to two eyes, or cut in two, or small whole potatoes. The yield was in proportion to the weight of seed potatoes planted. 4. The yield was largely increased by the use of fertilizers containing potash. Where fertilizers containing no potash were used, no increased yield was obtained. 5. A profit was obtained by applying potash fertilizers, or fertilizers in which potash is one of the ingredients."

Potato Experiments.

Seed Tests.

BULLETIN NO. 67, NORTH CAROLINA EXPERIMENT STATION. *Seed Tests. By Gerald McCarthy. Pp. 16.* The North Carolina Station has given particular attention to seed tests of late, and has called public attention to the value of this sort of labor. The present bulletin gives the results of many tests of garden seeds from samples procured in the open market. "With the exception of clovers and lucerne seed, most of the different kinds of seeds tested were found true to name and reasonably free from impurities." Many of the samples possessed low vitality, however, "due to the staleness of the seeds." "Stale seeds, unless they have been 'doctored,' are easily recognizable by an experienced person. They are usually lusterless, which is due to the absorption of the oil, which is always present in the seed-coat of fresh seeds. When stale seeds are found in packets, the containing packets are more or less stained and dirty, and such seeds should never be purchased. Stale lucerne seed has lost its shiny, greenish color, and become dull and brown and more or less withered. Red clover seed also becomes brown with age. In our warm and humid climate, the vitality of seeds, and especially of northern-grown seeds, deteriorates very rapidly; and seeds of two years old are, as a rule, not worth sowing. Yet, we find that most retail dealers in seeds act in utter disregard of this fact. They seem to think the quality of seeds in packets, like that of meats in cans, is of indefinite duration, and 'warranted to keep in any climate.'"

Seed Warranty.

The author recommends that seedsmen assume entire responsibility for their seeds, and states that European dealers do so. It is undoubtedly true that within certain limits, seedsmen should be held responsible for what they sell. The problem is a difficult one, inasmuch as failure as often results from poor treatment as from poor seeds; and, moreover, the seedsman cannot control the season or other conditions which affect his crop. The author makes much of the European means of seed responsibility, yet, in reality, many of these means are practically inefficient, particularly the one which he cites as a model. No doubt any reputable house would cheerfully "take back the seeds and pay cost of carriage both ways" if shown to be poor before they were sown. At least, such has been our experience. We recall that one of our leading houses filled our order gratis a second time for cauliflower seed to a considerable amount, upon our representation that its vitality was low.

But the whole subject of seed warranty needs discussion, and this bulletin will serve a good purpose in this direction.

Spraying in Oregon.

BULLETIN NO. 3, OREGON EXPERIMENT STATION. [*Practical Entomology.*] *By E. R. Lake and F. L. Washburn. Pp. 24.* Professor Lake's experiments upon spraying apples and pears with London purple for the codlin moth, give some interesting results. Four sprayings were given, the last one being August 12. The treatment had a decided benefit until "the latter part of August, but from that time to the date of picking, October 1, the affected fruit increased so rapidly that the final results on some trees of both sprayed and unsprayed were about the same. We had considered it unsafe to spray later than August 12, but the results would indicate that had we omitted the first spraying and given another in the latter part of August, effective work would have been done." The first spraying, immediately after the falling of the blossoms, seemed to accomplish little or no good, as "observations made for two weeks after the first spraying failed to give any indications of the moth's work in the fruit of either sprayed or unsprayed trees." The codlin moth must behave differently in Oregon than in the eastern states. The summary of the season's work is as follows: "1. Early spraying—just after the blossoms fall—is useless. 2. A mixture of 6 ounces of London purple to a hundred gallons of water is better than a stronger one. 3. The mixture should be kept thoroughly stirred while being used. 4. Young and vigorous foliage is more susceptible to injury by burning from the application of arsenites than is older or less vigorous foliage. 5. Spraying as late as September 1, or even later on winter apples, is desirable as far as fighting the moth is concerned. (There may be some danger in such late spraying, however, and this is one phase of the subject for next year's work). 6. All fallen apples that are affected should be destroyed daily. 7. The cost per tree for each spraying will average, in small orchards, about three cents. In larger orchards it would be less."

Woolly Aphis.

Woolly aphis upon apple trees was destroyed by a spray of lye-water—one pound of concentrated lye to three gallons of water. Kerosene emulsion was not found to be a satisfactory remedy.

Fighting Codlin Moth in Iowa.

BULLETIN NO, 7, IOWA EXPERIMENT STATION. Among other matters, this bulletin contains a valuable paper by C. P. Gillette, upon "Codlin Moth Experiments." Mr. Gillette controlled a small and isolated plantation of Duchess apples, upon which careful experiments were made with London purple and water, Paris green and plaster, and carbolized plaster. In every case, treated trees gave better fruit than untreated trees. The poorest results were obtained from the use of carbolized plaster, there having been a saving of 34 per cent. of fruit liable to injury. "This remedy could hardly be recommended even if very good results were obtained, as it does not kill the insect in any of its stages, but simply repels the moths, which seek the fruit of neighboring trees, on which to deposit their eggs."

Next best results were obtained from the London purple, which saved about 80 per cent. of the fruit. One pound of poison was used with 128 gallons of water; some of the trees were sprayed once and some twice.

Arsenites and Plaster for Codlin Moth.

Best results followed the application of Paris green and plaster. This saved 94 per cent. of the fruits liable to attack. "I believe that no one has ever reported on a remedy for the codlin moth, which, by careful counts, has shown as good results as this." One pound of Paris green was used with 100 pounds of plaster. This was thoroughly dusted over the trees, from once to three times Mr. Gillette thinks that two applications are ample. "Poisons can not be applied by this method as rapidly or easily as by means of a force pump, but it has the advantage of costing nothing for apparatus, and the trees can be dusted quite rapidly from a wagon, by driving on the windward side of the row. This method of applying the poisons would be specially useful where only a few trees were to be treated, and where it is thought that a pump can not be afforded." These results with the dry poison are certainly remarkable, and they indicate that a distributing machine like the lately perfected Strawsonizer, of England, may yet find use and favor in our orchards. At all events, these experiments afford a new proof of the efficacy of arsenites in the combatting of the codlin moth.

Wakefield, Etampes and Express Cabbages.

BULLETIN NO. 14, OHIO EXPERIMENT STATION. Like all Ohio bulletins, this one is suggestive and important. Mr. Green is one of the best testers of varieties in the experiment stations of the country. In this bulletin he has given the results of various tests with cabbages and cauliflowers. "The test of early varieties of cabbage was conducted for the purpose of determining synonyms and of learning the relative value of old and new sorts. The particular object in view was to compare Early Wakefield with Etampes and Express. Former trials had shown that there was little, if any difference in earliness between Early Wakefield and Etampes, while the former produced nearly 50 per cent. more marketable heads than the latter. The Express made but little better showing than the Etampes. The claims made by seedsmen that the varieties named are from a week to ten days earlier than Early Wakefield, were so much at variance with the results of our former trials that it seemed necessary to institute a more extended and thorough comparison than had hitherto been attempted."

The tests of 1889 confirm those of 1888. They "show no marked differences in the earliness of the three varieties, if date of first cutting alone is considered. In 1888, Early Wakefield and Express were both ready to cut June 29, and in 1889 the Express was three days ahead. Early Wakefield was a few days earlier than Etampes in both seasons. If we take as a standard of earliness the per cent. of the crop gathered at the first cutting, the results are essentially the same, there being a slight difference in favor of the Early Wakefield. A better standard of comparison is found in the per cent. of crop mature at a given date. A variety cannot be ranked as early simply because it gives a few mature specimens at an early date, but the number of specimens must also be considered. The Early Wakefield gave a greater per cent. of the entire crop within ten days from the time of the first cutting than either Express or Etampes. In fact, the whole crop, or 100 per cent. of the Early Wakefield was ready for market, in 1888, within ten days from the time the first head was mature, while Express and Etampes ranged from one-half to three-fourths of the crop in the same period. This is a matter of great practical importance to the gardener who wishes not only to secure the advantage of an early market, but is desirous of clearing the ground for a second crop. Our trials have shown, in every case, that the Early Wakefield yields a larger per cent. of its crop at any given early date, than Etampes or Express, and matures its entire crop earlier than that of either of the varieties named."

Quality, "referring particularly to market value," was measured for the three sorts. "About half only of the Express and Etampes were marketable, while all of the Early Wakefield heads were solid and fit for market. It should, in justice, be said, however, that solidity of head depends much on soil, climate and other varying factors. Etampes and Express frequently make a better showing than this. In some sections, particularly in moist climates, they produce good crops; but the experience with them at the station indicates that they are not to be depended upon in this latitude to give more than half a crop. The Early Wakefield, on the other hand, seldom produces any but solid heads, which are smaller than Etampes and Express, but being more solid, bring a better price."

Tests of other cabbages were also made, but the chief attention was given to the investigations recorded above. This direct and closely confined experiment with three kinds should serve as a model for those who test varieties. We do not hesitate to pronounce it the best conceived test of varieties yet made by the experiment stations.

Cauliflower Tests.

"Tests have been made during two seasons, of nearly all varieties of cauliflower offered by the leading seedsmen. The results indicate that but few varieties are suitable for growing in this latitude, and that many of the so-called varieties are synonymous. The early varieties have usually given better results than the late, whether planted in spring or midsummer. Not all of the early sorts are valuable, nor are all of the late kinds worthless; but the best are found among the early varieties, and the poorest among the late. The early varieties are more dwarf in growth than the late, which is a further advantage, because closer planting is more admissible with the former than with the latter. Better results have uniformly been obtained with late than with early planting, both with early and late maturing varieties. Irrigation has been practiced to some extent, but the water supply was too limited to admit of carrying on the experiment, except where the plants were set close together in beds. This method of planting seems to possess advantages aside from the facilities it affords to irrigation, but further experiments are necessary in order to determine its value in practical operations." Mr. Green sums up his cauliflower experience for Central Ohio, as follows: "The early varieties have usually given better results than the late, whether planted in early spring or midsummer. Better results have uniformly been obtained from late than early planting. The varieties or strains most highly recommended are Early Puritan, Early Padilla, Long Island Beauty, Early Sea Foam, Early Snowball and Vick's Ideal. These all appear to be nearly identical with Early Erfurt, and may be considered as strains of that variety. The varieties that do not seem to be suited to this climate are, Lenormand, Veitch's Autumn Giant, Early Paris, Eclipse and Algiers. Many strains of the Snowball have been sent out that are very inferior to that disseminated by Peter Henderson & Co."

Puget Sound Cabbage and Cauliflower Seed.

"The most prominent characteristics of Puget Sound cabbage and cauliflower seed are its large size and high germinative power. These large, plump seeds throw up very healthy and vigorous plants of a dark green color, and are easily distinguishable from plants grown from eastern seeds, particularly in the early stages of growth. There is frequently a difference in growth of 25 per cent. in favor of plants from Puget Sound seed at the time of vegetation. This difference continues to be manifest for a considerable period, but diminishes as the season advances, until it becomes imperceptible sometime before maturity of the plants. In the crop, no difference is discernible between plants grown from Puget Sound or eastern seed, either in time of maturity or quality and quantity of crop. The superior vitality and vigor of plants from Puget Sound seed serves a useful purpose in enabling the plants to better resist insect enemies and diseases, but the qualities that have been developed by long and careful selection are still more important. Given the same qualities in both cases, the Puget Sound seed are more desirable than eastern seed, simply because of the greater vigor of the plants grown from it. If the Puget Sound growers exercise sufficient care in growing their stock, cabbage and cauliflower seed from that locality will become recognized as the best in the market."

Clarence M. Weed adds some important records concerning the treatment of certain plant diseases. He calls attention to the fact that the combination of insecticides and fungicides in the same spray is often effective. This practice originated with Mr. Weed.

Bordeaux Mixture.

Bordeaux mixture, as usual, gave remarkable results in checking black-rot in grapes. Mr. Weed's method of preparing and applying the fungicide is as follows: "This season we sprayed it first, April 16, before the leaves had appeared, with a simple solution of sulphate of copper, treating the posts and trellises as well as the vines. This was done to destroy the winter spores of the fungus. We next treated it May 17, with the Bordeaux mixture made by adding six pounds of copper sulphate and four pounds of lime to fifty gallons of water, instead of twenty-two gallons, as ordinarily recommended. We usually made it by filling our Nixon barrel machine, which holds fifty gallons, nearly full of water, and then adding three or four gallons of hot water, in which six pounds of copper sulphate crystals had been dissolved. The freshly slaked lime was then poured in, and after a thorough stirring, the mixture was ready for use. Sometimes, instead of the crystals we used powdered copper sulphate, in which case it was not necessary to heat water to dissolve it; the powder simply being put in the barrel of clear water, and was soon dissolved. A third and last application was made June 25, using the Bordeaux mixture again. The treatment was very successful, saving to ripening a large proportion of the crop, while the fruit of the neighboring vineyards was wholly destroyed."

Quince Leaf-Spot.

Experiments were made to check the quince leaf-spot by the use of Bordeaux mixture. "The results indicated that the treatment was effectual. But as our check trees were not seriously attacked, the experiment was not as conclusive as it might otherwise have been. Bordeaux mixture applied to apples, in order to prevent the occurrence of the scab, was found to seriously injure the fruit.

Brown-Rot of Plums and Cherries.

"Perhaps no experiment of the season was watched with more interest that that undertaken to learn whether the brown-rot (*Monilia fructigena*), attacking plums, cherries, peaches and related fruits, could be controlled by the application of copper solutions. So far as the records show, no such experiments had before been made, and the annual loss due to this disease undoubtedly amounts to hundreds of thousands of dollars. In our treatment of the plum orchard, we began late in March by picking off and burying all the mummied plums on the trees. Then we sprayed them early in April (April 11), before the leaves came out, with a simple solution of copper sulphate; and twice during May (15th and 25th), the first time with London purple alone, and the second with a combination of London purple and the Bordeaux mixture, which treatment was repeated June 1. No further applications were made, except to one tree, which was sprayed with Bordeaux mixture July 16. After these sprayings the fruit was fairly well covered with the copper sulphate and lime, which stayed on, despite the many rains, until it ripened in September. At the time of picking, an undesirable amount was still present, so that it was necessary to wash the fruit. This was done this year in clear water, but next year we shall try the vinegar solution already mentioned.

"The results of the experiment, although not as encouraging as I could have desired, were sufficiently so to warrant its continuation through future seasons, with strong hopes of ultimate success. Although the meteorological conditions were unusually favorable for the rot, it did not appear until quite late, and injured only a small per cent. of the fruit—not nearly as much as usual."

Strawberry Analyses.

BULLETIN NO. 4, VOL. II, TENNESSEE EXPERIMENT STATION. Dr. W. E. Stone reports in this bulletin a useful and thorough chemical examination of the strawberry. Twenty varieties were examined, but the differences in composition between varieties are probably variable, being greatly influenced by soils, seasons and treatment. The amount of dry matter in the strawberry is very small, as the following remarks and figures show: "The averages may be assumed to fairly represent the normal composition of the strawberry, viz., 9½ per cent. of dry matter and 90½ per cent. of water. The strawberry is therefore essentially a watery fruit, less than one-tenth of its weight being solid matter. In this connection it will be of interest to quote the few available data with regard to other fruits:

Apples contain 16 to 20 per cent. of dry matter.
Pears contain 15 to 20 per cent. of dry matter.
Peaches (flesh) contain 11 to 14 per cent. of dry matter.
Plums (flesh) contain 18 to 20 per cent. of dry matter.
Currants contain 11 to 14 per cent. of dry matter.
Blueberries contain 18 per cent. of dry matter.
Grapes contain 15 to 25 per cent. of dry matter.

"From which it appears that the strawberry occupies the lowest place in the scale of comparisons." About one-half of the dry matter is glucose. "The amount of apparent cane sugar is, with three exceptions, less than 1 per cent.—on the average, only about ½ per cent." The free acid of the strawberry is largely malic, and exists to the average amount of 1.37 per cent. of the dry matter. Apples contain 0.8 per cent. of free acid; pears contain 0.2 per cent. of free acid; plums contain 0.9 per cent. of free acid; currants contain 4 to 7 per cent. of free acid.

The general composition of the strawberry is tabulated as follows:

	Per cent.
Water	90.52
Dry matter	9.48
Contained in dry matter—glucose	4.78
Increase of glucose by inversion, calculated as cane sugar	0.58
Free acid, as malic	1.37
Ash	0.62
Crude fiber	1.55
Ether extract	0.64
Crude protein	0.99
Non-nitrogenous extract	5.76

Food Value of the Strawberry.

"Considered as food, therefore, the strawberry would hardly be rated as very nutritious. The small amounts of food constituents present are so diluted by the ninety per cent. of water, that to sustain life a very large quantity would have to be consumed. The office of this, as well as other fruits, is not, however, so much one of nutrition as that of supplying the beneficial vegetable acids to the system, diluted and flavored by the water and sugar and delicate fruit aroma, the combination of which, in the case of the strawberry, has attained so delightful a degree of perfection."

Comparison with analyses of European berries show "that the European berry is sweeter than the American, but contains less protein and more fiber." This fact seems to indicate that we have not yet reached the limit of quality in our strawberry, for the wild plant from which it comes undoubtedly possesses as great possibilities as the parent of the European sorts.

Tame and Wild Strawberries.

As compared with native wild berries, the cultivated sorts show considerable gain in sweetness. "In the varieties examined, the average proportion of acid to sugar was 1 to 3.5. For the wild strawberry, the only references available, and these very meager, show a corresponding proportion of 1 to 2. This indicates that a change for the better has been made, but it is far from probable that the limit has been reached. Size and firmness of fruit have been successfully sought for. A similar increase of sweetness and concentration of flavor would wonderfully advance the desirability of some of the choicest varieties, and it would seem as if this were to a certain degree possible."

Strawberries for Tennessee.

Professor C. S. Plumb gives some good field notes on strawberries for Eastern Tennessee. "We would recommend, in the order given, the following five varieties, on the basis of quality alone: Prince of Berries, Sharpless, May King, Bidwell, Barry. Where combining quality with productiveness and salability in the market, we recommend the following, in the order given: Sharpless, Jumbo, May King, Indiana, Jersey Queen."

Fruit Testing in Michigan.

BULLETIN NO. 55, MICHIGAN EXPERIMENT STATION. *Fruit Testing at the South Haven Sub-Station. By T. T. Lyon. Pp. 32.* The Michigan station is fortunate in securing the services of the venerable T. T. Lyon as directing officer of its most important sub-station. Mr. Lyon is second to no one in this country as a judge of fruits, and his knowledge of pomology and his accuracy of observation and statement render all his labor authoritative and valuable. The present bulletin is the result of many years of observation upon his own place, which is now attached to the State Experiment Station; and so far as it expresses opinions of varieties, it is undoubtedly the most important bulletin upon varieties of fruits yet issued by the stations. The bulletin is a report of the fruits growing at the South Haven sub-station. Definite measures of varieties are given for the strawberry, raspberry and blackberry; and many other fruits are discussed in a briefer way. In the three fruits mentioned, the characteristics of varieties are stated in tabular form, after the manner of the well known fruit lists of the Michigan Horticultural Society. In addition, invaluable notes upon many varieties are given.

Strawberries in Southwestern Michigan.

"For a family or farm garden, to be grown in matted rows, mere quantity being of less importance than quality, a good selection of five varieties would be Alpha or Covill for early, followed by May King, with Belmont and Parry for medium and late, and Mount Vernon to close the season. If to be grown in hills for the use of the family, Alpha, Bidwell, Belmont, Sharpless, and either Mount Vernon or Kentucky would give a good succession. For market, in matted rows, a profitable succession would be Crescent or Haverland, with Miner as a fertilizer, Bubach No. 5, with Logan to fertilize it; closing the season with Mount Vernon, or perhaps Kentucky. For market, to be grown in hills, a good succession would be Covill, Cumberland, Jessie, Sharpless, Mount Vernon and perhaps Kentucky."

Red Raspberries for Michigan.

"The following list of varieties will afford a satisfactory supply for a family, while the surplus, if any, may be marketed if desirable: First, Turner; second, Herstine; third, Golden Queen; fourth, Cuthbert. If extra trouble in the way of winter protection can be afforded, the quality may be improved by the addition of the Brinckle."

Black-Caps for Michigan.

"As a desirable selection for a family plat, we would name Souhegan (or Tyler), Hilborn, and Nemaha, with Shaffer for canning. The foregoing will suffice also for a market plantation, with the possible substitution of Gregg in place of Hilborn."

Russian Poplars.

BULLETIN NO. 9, MINNESOTA EXPERIMENT STATION. *Russian Willows and Poplars, by S. B. Green. Insects Affecting Willows and Poplars, by Otto Lugger. Pp. 24. Illustrated.* For ornament, windbreaks and timber, the Russian willows and poplars are receiving much attention in the northwest. The best Russian poplars appear to be *Populus Certinensis*—of which *P. Petrouski* seems to be a synonym, *P. laurifolia*, *P. Sibirica pyramidalis*, *P. Wobsky*, *P. betulifolia*, *P. balsamifera* of Asia, and *P. Bolleana*. The last is considered particularly valuable for ornament.

Russian Willows.

Propagation of Poplars and Willows.

A number of good Russian willows are characterized. These are *Salix acutifolia*, *S. fragilis*, *S. laurifolia*, *S. aurea*, *S. Napoleonis* and *S. rosmarinifolia*. *Salix laurifolia* "without doubt has the handsomest foliage of any willow in cultivation." "Take cuttings from healthy, vigorous trees. Cuttings from such trees root easiest. It is generally best to make cuttings in the fall after the growth stops, and winter them over, buried in well drained soil, or plant out at once. Cuttings of willows and poplars may also be successfully rooted if made early in the spring before growth starts. Select clean two-year old wood, or strong, well ripened one-year old wood for cuttings. Make cuttings from eight to ten inches long, and as near to one-half inch in diameter as economical cutting will allow. Larger cuttings root nearly as well, but are more bulky to handle. See that the cuts are made smooth with a sharp knife. Have the land for cuttings thoroughly cultivated, and the ground mellow. Plant at least eight inches deep, in rows three feet apart, and press the soil close around the base of the cuttings. Do not tramp them in hard if the ground is wet. If the land is dry they cannot be too firmly placed in the soil. Keep well ahead of the weeds by running a horse cultivator between the rows very often."

Loss of Manure.

BULLETIN NO. XIII, CORNELL UNIVERSITY EXPERIMENT STATION. A part of this bulletin is devoted to the very important subject of "Deterioration of Farm-Yard Manure by Leaching and Fermentation," by Professor I. P. Roberts and H. H. Wing. The results of the experiments were as follows: "The results of one season's trial seem to show that horse manure thrown in a loose pile and subjected to the action of the elements, will lose nearly one-half of its valuable fertilizing constituents in the course of six months; that mixed horse and cow manure in a compact mass, and so placed that all water falling upon it quickly runs through and off, is subjected to a considerable, though not so great a loss; and that no appreciable loss takes place when manure simply dries." Three excellent plates accompany the bulletin, two showing the condition of many farm yards, where manure undergoes a shameful loss, and one showing the covered yard in the basement of the University barn.

BULLETIN NO. XV, CORNELL UNIVERSITY EXPERIMENT STATION. *Sundry Investigations Made during the Year.* The Cornell Station has adopted the practice of devoting the last bulletin of each year to the various experiments of the year which are too short for independent publication. Several matters of horticultural interest occur in this bulletin.

Onion Mold.

Professor W. R. Dudley describes and figures the onion mold. The disease has become very destructive in some portions of the country. The leaves begin to turn yellow and wither early in the season, and the plant is usually dead by the time the bulbs are from one-half to one inch in diameter. The disease is caused by a fungus, *Peronospora*

Schleideniana. It is common in Europe, where it is greatly dreaded. It was first noticed in this country in 1883, in Wisconsin, by Professor Trelease. It is probably introduced. "No remedy has been tried. But the success in France of the copper fungicides in the treatment of a related parasite, the potato-rot, justify us in hoping they will protect the onion also. No bulbs from a crop diseased the previous year should be set out; and the English are in the habit of sowing the onion seed in the fall, thus enabling the young plant to get a good start before the possible advent of the fungus in the spring."

Anthracnose of Currants.

Attention is called to a disease of currant leaves, to which Professor Dudley gives the name of anthracnose, *(Glœosporium Ribis)*. The species has long been known as attacking currants, even in this country, but it has not been mentioned as doing much damage. In the University gardens last year, the leaves of the red and white varieties were badly attacked, and they fell very early. "It is to be hoped that the peculiarly moist summer gave it an advantage it will not soon have in succeeding years, but it may be necessary to carefully watch the varieties susceptible to it, next June, and to apply occasionally, by means of a fine sprayer, like the Eureka sprayer, one of the copper solutions; for the entrance of the spores into the leaf must be prevented if the crop is to be protected. It is fair to suppose that the copper solutions will be as efficacious in this as in strawberry leaf-blight." Attention is also called to the quince and pear leaf-blight.

Tent Caterpillar.

Professor Comstock calls attention to the serious ravages of the tent caterpiller, and recommends three methods of fighting the insects. The best plan is to gather the egg clusters in winter. This is a perfectly feasible operation, as the eggs are laid in a large and conspicuous mass about young twigs. With long-handled pruners, like a Waters pruner, these can be readily clipped off. The masses should be burned. As soon as the larva hatches it often eats into buds, and the destruction of the eggs is the only means of preventing this injury. The second method of destruction is to burn out the webs or tents in the evening or early in the morning before the larvæ leave them. The insects can also be destroyed by arsenical sprays, applied as for codlin moth.

The Orange Melon.

Professor Bailey describes, under the name of Orange melon, the fruit which is variously sold as Vine Peach, Mango Melon, Vegetable Orange and Melon Apple. It is a variety of the musk melon species, although most of the characteristics of the fruit are more nearly akin to the cucumber. "The variety presents some desirable features, but it is overpraised." A figure of the plant is given.

Crandall Currant.

The Crandall currant is a simple variation of the "flowering currant" of yards, *Ribes aureum*. "The plant is hardy and vigorous, and so far, our specimens have been free from insect attacks, although the currant worm was very abundant upon adjacent rows of common sorts. The bushes attain to a large size, and need more room than other currants. The fruits are large and fair, bluish-black and polished. They separate from the stem and are therefore picked and sold singly, like gooseberries and cherries. The flavor is sweet and agreeable, though not pronounced. There is none of the grossness of flavor characteristics of common black currants. It makes good stews, pies and jellies, whether used green or ripe. In jelly we prefer it to other currants. The variety is wholly distinct It represents a new type, which, when further selected and improved, must come to be a staple."

Record is made of well marked variations in peas in consequence of variation in soil. Clay, as compared with loam, gave later, taller, greener and more glaucous plants.

Transplanting Cabbages.

"It is a common practice among gardeners to set cabbage plants to the depth of the first leaf, upon the supposition that deeply set plants give better heads than others. The experience and observation of the writer, during several seasons, have led him to doubt the greater efficiency of deep planting, beyond some influence it may exert by preventing injury from very dry weather." The summary of the season's experiments confirm the supposition that depth of transplanting does not augment heading tendencies: "Of the twelve lots, one-half did best from each treatment. The comparative ratios are 13.46 to 13.6, in favor of deep plantings. In other words, in 565 heads, those from the deep plantings averaged about two ounces per head heavier. 270 cabbages gave better results in shallow planting, and 295 better in deep planting. The differences in the two cases are so slight as to appear to be indifferent."

Old Squash Seeds.

"There is a belief that new or fresh seeds of squashes, pumpkins and melons produce plants which 'run to vine' more than those from old seeds; and this supposed redundance of vegetation is considered to exist at the expense of fruitfulness." Extensive tests upon this point were made with squashes, watermelons, cucumbers and muskmelons. "There was no evidence whatever that older seeds give shorter and more productive vines. In fact, their was no uniformity of behavior between seeds of like ages. The largest vines in some instances came from oldest seeds, in others from the newest, and in others from those of intermediate ages. All this variation is evidently due to heredity of the individual seeds, or to conditions of growth of the immediate parents, rather than to age of seeds."

Patent Germinator.

A "New Preserver and Germinator of Cereals and Seeds of all Kinds," sold by Dimpfel, of New York, was tested. "With the exception of an indication of a trifling advantage in the tomato seed tests, in which the results may have been wholly accidental to the treatments, the germinator gave no results in germination superior to those obtained from soaking the same length of time in water; while in radishes the damage done by the material was marked. In radishes and turnips, it also lessened the rapidity of germination." L. H. B.

THEY SAY

This is an open department for the use of all interested observers, from whom correspondence is solicited on any topic of horticultural interest. Valuable items are frequently crowded out, but all will appear in due time.

Medlars and Other Fruits.—Prof. Bailey says (p. 185) it is a singular characteristic of the medlar that it is inedible until it begins to decay. Is not this the case with all our fruits? We do not care for a hard apple, though perfectly mature. What is the mellowing process in any fruit but the beginning of the disorganization of its tissues?—W. F. MASSEY, *N. C. Experiment Station*.

Celery Pests.—I find two animals that trouble my celery, and I can find no reference to them in the books. The first is what we call "Sow bug." It is a gray, flat bug, full size about ¾ inch long; it eats on the outside of the celery stalks, low down under ground, very much disfiguring the handsome bunches. The second is a "one-thousand-legger worm" about 1¼ inches long, small; sometimes thin and thick and both disfigure the celery. Who can give me a remedy?—J. E. M., *Portsmouth, R. I.*

The Catalogues.—In behalf of the army of seedsmen, allow me to reply to the article on page 181 of THE AMERICAN GARDEN, headed "Do Catalogues Pay?" Part of the article in question I heartily endorse, but part of it I do not. It is true that with some of the seedsmen this catalogue business is stretched to its utmost. We have not yet reached that stage in horticulture where cabbages require the use of ladders, or beets can be utilized for gate posts, but after all, what does it matter? It is only the gullible who can be "gulled" by these things, and to tell the truth, they rather enjoy it. There is a class of people who like to be humbugged, else why do they return year after to the same source? "Why don't the seedsmen get up something that will tell us how to manage our garden?" *Don't* they? Many of them devote almost unlimited space to this very subject. They tell you how to prepare and care for your hot-beds; they advise you what to sow, the time and manner of sowing, and the subsequent culture. But it seems this is not enough: They must tell the public how to *cook* the products of their garden. Well, really! What next? The idea of asking us to turn our catalogues in *cook-books* is utterly ridiculous. It is well enough, at times, to give some hints on preparing certain vegetables for the table, but to comply with such a demand in full, would necessitate the seedsmen having the purse of a Gould or a Vanderbilt to fall back upon. Our catalogues cost money. Few of us are bankers or millionaires; hence could not stand such a pressure very long. Then again, most of us send out our catalogues free, others charge from 10 to 25 cents; cook-books vary in price from $1.50 to $5 each. Would the public be willing to pay us any of those prices for a catalogue with a cooking department added thereto? I fancy not. But in case it would, let the fact be made known, and I doubt not the seedsmen will at once take steps to accomodate all concerned.—L. E. R. LAMBRIGGER, *Wyoming*.

Model Peach Orchards.—Those orchards may be good models for the Michigan climate, but I would like to show Prof. Bailey some on the "Eastern Shore," that show different handling. These remind me of a visit I paid many years ago to the place of Rev. Mr. Knox, on Monongahela Heights, opposite Pittsburg, then a noted nursery, especially for grapes and strawberries. It was a mucky day in March, and the Pittsburg smoke lay like a pall over the landscape. Mr. Knox was showing me his various fruit plantations, and I found it difficult to distinguish different sorts of trees, then leafless, because of the sooty coating all had gathered. In one part of the grounds I noticed a large block of what I took to be uncommonly large currant bushes. On complimenting Mr. Knox on the magnificent growth of his currant bushes, he turned to me with a laugh, "*Currant bushes! why, that is my peach orchard.*" As I was then fresh from the "Eastern Shore," I enjoyed a hearty laugh myself, and asked him to please come down and let me show him a real peach orchard.—W. F. MASSEY, *N. C. College of Agriculture.*

[NOTE.—The Michigan orchards which were describin the March number are models for Michigan, and they receive the most expert care, and are highly profitable. Michigan growers do not expect to secure the large trees of the south. It would be an interesting discussion if correspondents in different latitudes were to describe the model orchards of their respective regions. —ED. AM. G.]

Death of George Thurber.—Dr. George Thurber, the well known botanist, and for 22 years editor of the *American Agriculturist*, died April 9, at his home near Passaic, N. J. Dr. Thurber was particularly distinguished among botanists for his knowledge of grasses. His name designates several species of plants from the west and southwest. Asa Gray long ago named a genus of the mallow family *Thurberia*, but this genus is now called *Ingenhouzia*. Dr. Thurber was a good writer upon many subjects.

Those of us who can do anything to perfection rarely suffer for want of work. Usually it is the inefficient who are unemployed, and this is especially true in the smaller trades and among handicraftsmen. Poor manufacturers, cooks, preachers or gardeners all have a hard time of it. Good ones do well where others find no employment. A good washerwoman is in demand wherever white clothing is worn, and can be the most independent of women. People will condone faults in her that would be endured in no other of the sex. There is always room at the top, but it is hard getting there. We are more likely to be wanted if we give time and attention to one thing until we have mastered it so that no one can do it better than ourselves. Gardeners who have thoroughly mastered the arts of vegetable raising are in demand, and so are those who can raise the best stove plants; but when a man applies for a situation, claiming to grow everything from horseradish to orchids, understands growing pineapples and cherries under glass, is the equal of Robinson as a landscape gardener, while incidentally he can keep the family and the market supplied with small fruits, we are inclined to be suspicious of him if we have had experience in hiring gardeners, or if we engage him we pay dearly for our experience.

Potatoes in the South.—Mr. Ullathorne's article (p. 168) shows how rapidly the new practice of growing seed potatoes is extending in the south. Only a few years ago we thought that it was absolutely essential to get northern grown seed for the early potato crop. Now we know that potatoes raised in autumn here from northern seed planted in spring give us our best seed, but I do not think it advisable to extend the process further. Enough northern grown potatoes should be planted in spring to furnish seed for the late crop, or deterioration will set in. All the northern potatoes we are now getting here (March 15) are badly sprouted and unfit for table use, but I am eating N. C. grown potatoes dug in December last, which have not started an eye and which, upon cooking, show by their dry and mealy condition that the starch is still unchanged. It will not be long before the northern markets will seek a spring table supply of these magnificent potatoes to take the place of the clammy sprouted potatoes of spring time, and a new demand will set up for a southern product. Most of our growers plant this late crop too early. We had potatoes last fall which did not appear above ground until after the middle of September, and yet made a better crop than some planted in July. The proper time for planting here is 15th to 20th of August.—W. F. Massey, *N. C. Experiment Station.*

The Orchid Water Lily.—Would not our florist friends who wish to introduce rare and beautiful plants to public notice find it just as profitable to tell people just what the plants are which they offer, instead of manufacturing new fancy names for them, and not mention their scientific ones? This practice is leading to a great accumulation of "common" names for various plants, which is undesirable. In the last American Garden one firm offers the "Orchid Water Lily," and gives no information as to its botanical name. The plant offered is evidently *Pontederia crassipes*, and is no more a lily than the so-called water lily and other plants called lilies. It is worthy of all the praise these gentlemen give it, and I hope they may sell a great many, for it is a very easy and interesting plant to grow in a tub of shallow water with a little fertile soil at the bottom. The plant has already been called "Water Hyacinth," and though no more related to hyacinths than to lilies, the spike of bloom suggest the hyacinth more than the lily.—W. F. Massey, *N. C. Experiment Station.*

Heading Cauliflower.—There is no trouble at all in heading cauliflower set in frames in autumn. We plant six plants to each sash and fill in with Boston Market lettuce. The lettuce is headed and cut during the winter, and by the time the cauliflower plants crowd against the glass, if they have been properly hardened by airing, the sashes can be stripped off and used on other frames for hardening off tomato plants. Some years ago I had 1,000 sashes in Virginia used in this way, which made the most remarkable crop of cauliflower I ever saw; 6,000 plants of Snowball cauliflower made 6,000 marketable heads, a result I never had before nor since. —W. F. Massey, *N. C. Experiment Station.*

The Phylloxera Restrictions.—The Secretary of Agriculture is in receipt of a communication through the Italian Legation at Washington and the Secretary of State, from the Assistant Secretary of State of the Kingdom of Italy, calling his attention to the fact, that the importation into Italy of plants from countries which, like the United States, have not adhered to the anti-phylloxera convention at Berne, cannot be effected without previous and express authorization of the Royal Minister of Agriculture and commerce.

In addition to the aforesaid authorization, a certificate must accompany shipments of plants, to be issued by the local authorities and containing the following declarations:

1. That the plants shipped are from earth that is at least twenty metres distance from any vine, or that it is separated from any vine by some other obstacle that is deemed sufficient to prevent the extension of the roots of such vine.
2. That such earth does not contain any vine.
3. That no vines have been deposited therein.

The Secretary of Agriculture requests all whom it may concern in the United States, to take notice of the foregoing regulations, in order that plants sent from this country to Italy may not be refused admission at the Italian frontier.

Tree Bark.—"For the tree of the field is man's life." This being a well authenticated fact, how faithfully man should care for, and tenderly foster the precious life of the tree. The bark is the life-guard of all exogenous plants. Unlike the endogens, the seat of life in all northern trees is located in the cambium layer next to the bark. In order to insure a long lease of life in certain plants, nature has endowed them with a thick rough bark, a protection so unique and perfect in all its equipments that the tree stands, in some instances, firmly and majestically against all the vicissitudes of summer and winter, for over 2,000 years.

The bark differs widely in quality; on some trees it is coarse and spongy, and half an inch in thickness, perhaps no more potent in repelling heat and cold than the bark of another tree with very fine texture and one-half its diameter, especially if this latter tree happens to have rough bark like the yellow birch. This scaly, rough exterior will modify the direct rays of the sun, and thus prevent "sun scald." In a climate where the extreme summer heat surpasses that of central equatorial Africa, as appears to be the case in the northwest, trees with a thick, or even rough bark, cannot be too highly prized. It is a simple fact, when one comes to fully understand it, that no plant, however hardy in its inherent woody cell structure, can long endure 105° of heat, and 50° below zero, unharmed, unless properly clothed. We were so elated when we made the discovery that a tree with a good thick bark or one with a very rough bark, like the shellbark hickory or hackberry, would not "sun scald" in this climate of tropical heat, that we had to invent a new phrase expressly for such worthy plants—trees with *persistent bark*.

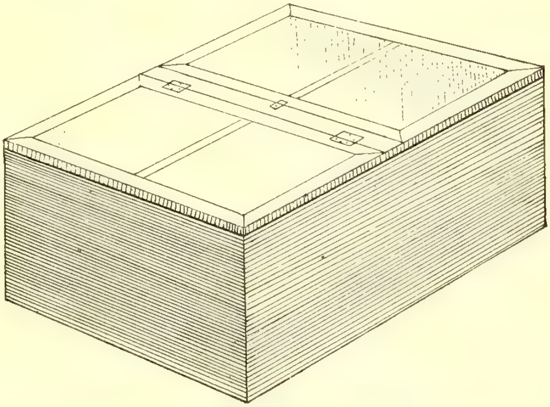
This study of tree bark has led us to one of the most important discoveries ever made for the pomology of the northwest, that among all the different species of the apple tested in this climate, nature has endowed but one with a rough exterior finish that just fits it for this climate of great extremes of heat and cold, and that is the *Pyrus coronaria* or wild crab.—A. W. SIAS, *Minnesota*.

Manettia cordifolia.—This is not a plant of recent introduction, as it has been in cultivation since the early part of the century. It was brought into general notice, I think, by Mr. Wm. D. Brackenridge, now of Govanstown, Md., who collected it on the west coast of South America when botanist of the Wilkes South Sea Expedition. It has been long used in the greenhouse for late fall and winter blooming, but it does well out-doors and is useful on small trellises. The fleshy roots can be kept nearly dry in soil or sand in winter, in a cellar, and can be readily propagated by cuttings of the roots in heat in spring. The flowers are small, but numerous. A pink variety of manettia is said to grow in Cuba, but I have never seen it.—W. F. MASSEY, *N. C. Experiment Station*.

The Horticulturist's Prayer.—When you ask the Lord to multiply and preserve the fruits of the earth, supplement your prayer with a force pump and arsenic.—DR. J. A. LINTNER.

The Peach Crop will undoubtedly be light this year. The unprecedented warm weather of early winter caused the buds to swell, and the sudden cold snap in March injured them seriously. In the Michican peach region and along the Atlantic coast, as well as in all interior places, the damage is great.

Varieties of Plums and Black-Knot.—Secretary Woodward says that Lombard, in western New York, is particularly liable to black-knot, and he has cut out his Lombards for this reason. Bradshaw is an excellent plum. The Niagara is the same; it is liable to overbear. The Richlond is one of the most profuse bearers; it always needs thinning. The Washington is one of the finest plums grown, but is especially liable to rot in some years; it escapes black-knot to a large extent.



PROPAGATING CASE.

An Efficient Propagating Case.—The accompaning illustration of a propagating case should have appeared with Mr. Card's article on the propagation of dracænas and nepenthes in our last issue. The case is a simple bottomless box about four feet long, three feet wide, and two feet deep, and covered with sash. In such a case the temperature and moisture are under the control of the operator, and good results are easily obtained.

The Food of the Sparrows.—My own personal observation goes to confirm the general opinion that these birds are graminiverous, and only sparingly insectivorous, mainly during the breeding season. Like animal life generally, they are governed by their environment. They go where there is the most food. I have often seen the suggestion made that we kill and eat them, but for myself I beg to be excused, for if I am not mistaken, over half their food is found in horse-dung dropped in the streets. The unmasticated grain therein seems to be just to their liking, and is mainly the food given to their young. This handy and ever present supply of food is the main cause of many of their habits, and the reason why they come from the country to winter in our towns and cities. It also explains why these birds are less insectivorous here than in Europe. We use more horses and feed them mainly unground oats, which are often found unmasticated in the dung; and this further explains why these birds are fat and lazy, and breed so enormously. They are very cunning and wary. Nothing escapes their observation. I have often thought that they were malicious as well as mischievous, for they slyly and clandestinely pick open the skin of my grapes, apples, plums, pears and cherries.

The pulp is not consumed, and they seem to have little desire for this kind of food, but peck holes in the skin, so that it rots and perishes, simply because of their naturally mischievous and evil nature. It is not only now and then a fruit or a berry, but they go all over the trees and vines, and everything that is getting ripe is tasted and left to rot. Our native birds seldom commit these wanton acts.

It will be seen, therefore, that the sparrow is a bird out of place, taking possession of a country that was better supplied by its own bird fauna, a usurper that does not meet the expectations of those who introduced it, a disturber of our natural economies, and a general failure. It is very generally remarked that our native birds were more plentiful two seasons ago than for many years. This again refers to the great storm in March of that year. Our birds are migratory; in passing northward they found their old haunts left vacant by the sparrows killed by the great storm, so they have re-occupied their old homes.

It was by man's aid that this enemy of our native birds was introduced, and he must aid in destroying it before we can expect a return of our own more valuable insectivorous birds. We must choose between this native and foreign fauna. This work naturally becomes the duty of the state. Individual effort is not equal to the work. Nor can we begin too soon, because our insect enemies that would have been destroyed by our own native birds already threaten the farmer's crops. It is not, therefore, alone a question of what crops the birds destroy. We are being overrun with intolerable insect enemies. The birds seem to come and go in an idle, unsettled manner, and fail generally to fill the useful purposes of our native bird fauna.—D. S. Marvin.

Croton Bug.—"Insect Life" for March gives a continuation of Professor Riley's "Insect Pests of the Household," being a chapter on cockroaches, illustrated by drawings of the most common species, the croton bug or German cockroach, showing each successive stage from the egg to the adult. The roaches which infest the country are of three species; only one of which is indigenous, and this one is the least harmful of the three and is commonly called the "black beetle." It is much larger than the other two, being frequently an inch and three-quarters in length. The other two are imported species, the largest being the oriental cockroach and nearly allied to the American species just mentioned. It particularly thrives in ships, which it infests the world over. But the croton bug, so called from having first appeared in force on the introduction of the Croton water system in New York City, is by far the most abundant and does the greatest damage. They are nearly omnivorous, but particularly eat everything containing paste, and therefore wall-paper, book-bindings, etc. The only practical remedy is to be found in the free and persistent use of fresh buhach or pyrethrum powder.

Spray your trees, spray your grape vines, spray your potatoes. Spray everything.

Growing Black Walnut on Waste Land.—Owing to the great and increasing demand for black walnut for the manufacture of furniture and inside decoration of railroad cars and dwellings, it is becoming very scarce and the price is advancing rapidly. The supply now comes from Indiana and West Virginia, but will soon be exhausted in those states. Therefore we are confident that it would be a good investment for land owners and farmers to turn their attention to the growing of it. Every farmer could, with small cost and little labor, put out trees, planting them on waste land or that which is too rough or stony for cultivation. It is not necessary to have them in rotation, or to set ground apart for them, but put them wherever there is a waste spot. Fire wood is becoming of little value on account of the general use of coal, and as the wood-lot is cut off it can be reset with black walnut trees. They can also be set in very open woods. It is necessary to have a nursery of growing trees on hand, so that they can be planted out as opportunity offers. In digging the hole for them, make it large enough to hold plenty of good top soil or leaf mould from the woods, upon which to place the tree to give it a good start. They should be set about three inches deep. The only attention they require is to keep briars and undergrowth cleaned off until they are large enough to shade the ground. To raise the young trees, bury the walnuts in the ground in the fall in thin heaps, working the dirt well amongst them, and cover about three inches deep, so that they will be moist. A slight freezing helps to open the shells. In the spring, plow a piece of good ground and furrow three feet apart, putting in plenty of good strong manure. Cover the manure lightly and drop the nuts in about eight or ten inches apart. Cover two inches deep. When they appear above the ground, keep them clean and the middle of the row well plowed. They can be set out at any size, the larger the better, as they are not so liable to be broken down or injured. Set 15 feet apart each way. This gives 175 trees to an acre, which in 25 years would be worth at the present selling price of the wood at least $30 per tree and probably nearer $50. It is not necessary to grub or clean the stumps or roots all out, but set the young trees out and keep any other growth of wood cut out. Even if the land is rough and rocky so the trees grow full of burls, twists or curls, so much the better, as wood of that kind has about four times the value of straight wood, being used for fancy veneering. The nuts are of considerable value as fuel, burning with a bright blaze and giving a more intense heat than coal.—S. B. Conover, *New York.*

I Still Prefer London purple to Paris green for use upon the apple, cherry and plum, except in seasons like that of 1889. The meteorological conditions of last year were particularly injurious to London purple tests.—Dr. J. A. Lintner.

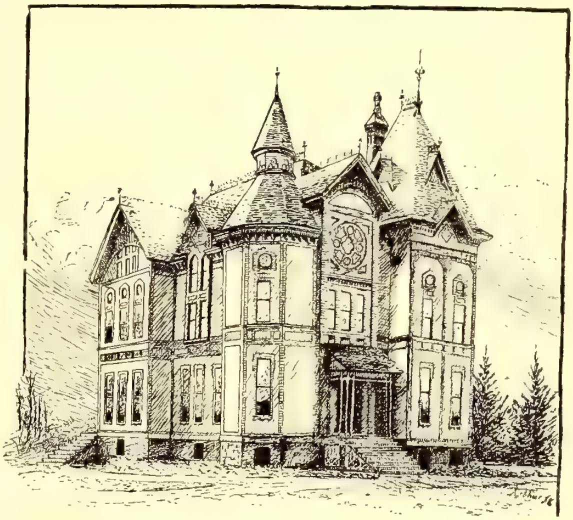
The Palmer Raspberry is mentioned as one of the best of the recent black-caps. It has been tested since 1882, and is now put upon the market. It is said to ripen with Tyler and Souhegan.

Women in Horticulture.—Foreign publications have taken up the question of the work of women in horticulture, which has been so strongly agitated by the horticultural press of this country. A writer in the *London Garden* suggests that if women are to enter this field, they be induced to don a costume to suit the occupation. He contends, and rightly, that the habiliments of the gentler sex are so constructed that few of the positions of the body necessary to horticultural pursuits out of doors can be assumed without positive pain to the wearer. Here is evidently an opportunity for an advocate of "dress reform."

Economic Geology of Washington.—The soil conditions of eastern and western Washington are quite as dissimilar as the climate. When we contemplate the influence that the Columbia river exerts, we are quite apt to associate and limit them to Oregon, but in reality the river dominates Washington far more than Oregon. It is mainly some of its southern tributaries that exert their influence over the latter. The major portion of the Columbia valley lies in eastern Washington. On first appearance that is a somewhat monotonous and a very peculiar country, made so by the comparatively recent origin of the surface strata. During a former epoch, it has been the bed of a lake. The lake has been filled and obliterated by a mountain, perhaps Tacoma, then, of course, an active volcano. The output of the mountain fills and overlies much of the valley resting upon the sands and gravel of the old lake bed. The mass is mainly basalt, whose prismatic columns are seen in most of the hills. During the closing epoch of the volcanic period, vast masses of volcanic ashes were thrown out, and now aid in forming the rich potash-laden soils of the valley, precious for wheat, vineyards and orcharding.

The economic geology of western Washington is equally, if not more, interesting. Here the working factor in soil formation was cold instead of heat. The soils are older than those east of the Cascades. Mount Tacoma was again the probable center of activities, this time glacial. Puget valley had been the bed of a lake in which the characteristic and prevailing gravelly soils were laid down in very unquiet waters. Then the conditions changed; the climate became arctic, perhaps like Alaska now, the icebergs finding exit into the ocean through the straights of Juan de Fuca, plowing out the ravines and complicated channels of the sound. The whole surface of the county was changed by abrasion and denudation. The country is now densely wooded with mainly evergreen instead of deciduous forests. One can see but a few rods into these forests, the boles of the trees seeming a solid mass of timber. The manzanita, a pretty evergreen shrub of six feet in California, here becomes a tree of twenty feet. The river bottoms are rich and productive lands. The gravelly prairies and uplands are better adapted to grapes, and fruit culture than general farming. Nearly all the fruits of the east do well and produce abundantly.—D. S. Marvin, *Tacoma, Washington.*

Loss at the Michigan Agricultural College.—The Botanical Laboratory of the Michigan Agricultural College burned on the night of March 21, the fire originating in the top story by a defective flue. This was the first building erected in this country for the express and sole purpose of a botanical laboratory. It was built in 1880 at a cost of $6,000. It was one of the handsomest buildings among the many at this famous institution, and its equipment was large and invaluable. The lower floor was devoted to a large class and microscope room, office and herbarium cases. The second and third floors contained a very large and unique museum, especially rich in instructive features of our native flora and general agriculture. Very large collections of native woods, in novel shapes and arrangement, were particularly prominent. This department was more than the ordinary exhibit of woods, for it comprised manufactured articles, samples of lumber and many things of direct economic value. The museum also contained one of the best collections of Indian corn in existence. This museum had been a life work with Dr. Beal, the professor of botany. It was partially saved, however, and all the microscopes and most of the collections upon the first floor were saved. One of the most lamentable features of the loss was the burning of the entire Wheeler Herbarium, an immense collection of Michigan plants. This herbarium represented twenty-five years of unremitting toil by C. F. Wheeler, of Hubbardstown, Michigan, the senior author of Wheeler and Smith's Flora of Michigan. Mr. Wheeler was last fall called to the college as assistant in the botanical department, and he gave his collection to the institution. He had just spent eight weeks in overhauling it, and a few days before the fire it was carried to the upper floor to be permanently mounted. It was therefore impossible to save any of it. The loss of this herbarium is one which can not be replaced. The accompanying cut is a good illustration of the building.



The Eucalyptus in California.—I am informed that there are upwards of forty species of these gum trees of Australia in cultivation in California. Of these, the blue-gum, or *Eucalyptus globulus*, is by far the most common, and is the most valuable tree to the state. To the "tender-foot" it is a surprise in all its features, as well as somewhat of a curiosity botanically. We are at first surprised at its truly wonderful rate of growth. I am informed by several reliable people that there is a blue-gum in Monterey county which was transplanted at one year old six years ago, and that it is now a little over one hundred feet in height. There is one in sight from the window where I write a little over ninety feet high, and which, I am assured, is only nine years old from the seed. These do not seem to be exceptional cases. Nearly all Californians fail to see the wonderful value of this tree to the state, and what a tremendous income could be derived from it by planting large areas of it for fuel alone at certain points. Take Los Angeles, for instance, where firewood ranges in price from $12 to $30 a cord, and where firewood must always be high. One can hardly estimate the value of 160 acres of blue-gum planted on the wonderfully deep, rich, moist soil directly west of the city toward San Pedro. Here land can be found which is too wet for cultivation, but of exceeding richness, and therefore exactly suited to the culture of this tree.

This tree should also be extensively planted on the low moist soils of the Atlantic sea-board wherever the wild bitter orange will thrive. It is a fact that it reclaims wet land and prevents malaria, by draining the land with its roots, and the resinous fragrance thrown off by its foliage is wholesome. We see the gums in all their glory at San Rafael, near San Francisco, where the Hon. William A. Colman has planted 70,000 trees, largely *E. globulus*. The thinnings of the groves are already giving him a large income. Two large street trees were cut directly across the street from where I now write, and I measured the growth with a rule, and the last year's layer of wood on both trees was in places four inches in thickness, and the thinnest place I could find it was two inches. These were ordinary street trees, without special advantages or cultivation. These facts give an idea of the growth of this most wonderful tree. It is an evergreen, with very dark-green lanceolate curved leaves, drooping, hanging edgewise to the sky, 6 to 12 inches in length, closely resembling the leaves of the peach. On young trees and on the new shoots, where trees have been cut back, the leaves are of a much lighter or glaucous shade of green, are much wider and rounded at the point, and are placed opposite on the twigs, with the wings of the leaves large, nearly surrounding the twigs; the twigs are four-sided, with sharp angles, while older twigs are round and smooth. In fact, to cut twigs from the two growths on the same tree, it would be hard to made one believe that they were from the same species. The eucalypti will withstand about 15° of frost without injury, and perhaps 20° to 25° without material injury. Some species are hardier than others. *E. globulus* is neither handsome or pretty, but may be called grand or noble. It is strongly fastigiate, much like the Lombardy poplar. The older bark is strongly deciduous, peeling off at all times in long thin strips. *E. globulus* and the Monterey cypress are the two trees everywhere present in California where man has made a home.—D. B. WIER, *California*.

Rapid Growth of Trees.—I have always contended that whenever it shall be proved profitable to grow trees for timber, the universal genius of our people for seeing a dollar, though in a distance, would give us all the timber we need within a quarter of a century, and that the talk of untold hundreds of years to replace a rotting forest is rather wild. To show how fast a tree will grow when it has the chance good forestry would give to let it grow, a maple tree (*Acer dasycarpum*) near our office, will illustrate. Exactly 21 years ago this month, I bought the ground and a young maple tree, possibly three or four years old—or about three inches thick, was suffered to remain. To-day I measured it and found it, four feet from the ground, nine feet six inches in circumference. I doubt whether any maple could do better than this; but it shows what can be done. Much of our present forest land is mere waste, and "ruthless" as the woodman's axe often is, it is as often merciful. There are yet thousands of acres, sustaining nothing but wild animals, that would support thousands of people if cleared for farm or garden crops, and with half dead trees inviting forest fires, that should be cleared. We want as much new forest planted as old forests preserved.—THOMAS MEEHAN, *Phila.*

In the April Number, advertising page 11, is the statement that the Cowthorpe oak in Yorkshire, Eng., is the largest tree in Great Britain. I have never seen it, but have seen the "Wingfarthing oak" in Norfolkshire, about seven miles from Athleborough. In 1884 I paced the circumference of the tree at 90 good paces. It seemed to be a conical trunk of some 75 or 80 feet in height, hollow mostly, and shooting off vigorous and green limbs from the top, giving it a dumpy appearance. The evident antiquity of the decaying trunk, together with the flourishing growth of the topmost leaves, seemed to suggest an uncanny union of death and life. Near by was a smaller tree which would have attracted great attention elsewhere. The general contour of Norfolkshire land somewhat resembles the prairies of Iowa. Some one has written of the "prolificness of England." It is certain that birds, beasts, trees and men do thrive there.—G. ST. JOHN SHEFFIELD.

Everyone Knows, in a general way, that thoroughness and high culture are essential to success in every branch of horticulture; yet very few, after all, possess a working knowledge of this intense culture. There are few who have actually tested the possibilities of the soil and of plants. But when once a man has experienced the results of the best endeavors, he immediately enters a realm of new and wonderful interest and profit, and will not return to poor practice

Red Cedar.—To what does A. C. S. refer (p. 185) to as the Rocky Mountain variety of red cedar? This is the trouble with so-called common names. Does he mean that he has *Juniperus virginiana* from the Rocky Mountains, or some other tree that has been christened red cedar? Here *Juniperus virginiana* is called red cedar, *Cupressus Thyoides* is called "juniper" and *Taxodium distichum* is called cypress, and so it is everywhere that the "common" names some people are so fond of create confusion.—W. F. MASSEY, *N. C. Experiment Station.*

Turtles as Snail Catchers.—In my fern case there were snails; their tracks smeared the glass, and some of the choicest ferns and begonias were bitten off and utterly ruined. Of course, I turned to my AMERICAN GARDEN for relief, and found I must get a box turtle and put him in the case. Our small boy found one, and he was soon behind the bars. But the snails weren't scared a whit, and the turtle was the means of bringing me into disgrace with one of our rich neighbors. She is a very fat lady, and one day came in to see the ferns, setting herself in a large arm-chair close to the glass. Right in the midst of our talk, she gave a blood curdling scream, and yelled! "A mouse! A mouse!" We pulled her up, and there was the poor turtle trying to get from the seat of the chair to the floor. The glass of the case being lifted a little, tired of hunting for snails, he had escaped. We thought him a failure as a snail catcher, and he was thrown out of doors, but my faith in THE AMERICAN GARDEN is still strong.—A. L.

Cypripedium Arietinum in New England: Dicentra Squirrel Corn.—In the notice of "Some Native Orchids" in the April issue of the GARDEN *Cypripedium arietinum* is spoken of as not having been reported in New England south of Vermont. In the report of the Connecticut Board of Agriculture for 1885, there is a list of wild plants growing in Connecticut, by James M. Bishop of Plainville, and *C. arietinum* is given as found at North Haven, and I have found it also in Cornwall, Litchfahl county, 50 miles distant. Another correspondent askes if anyone has cultivated the little "Dicentra Squirrel Corn." I transplanted it when in blossom to my garden, and it flourished for many years, till choked out by more vigorous plants.—T. S. GOLD, *Conn.*

Many Pears may be picked even a month or more before they are ripe, and if they are well handled in a dry room they will be ready for market two weeks in advance of the regular crop. Some growers pick a part of the crop from the trees in this manner, and allow the remainder to hang. In this way a succession is secured.

Death of Charles Gibb.—Mr. Charles Gibb, of Abbotsford, Quebec, died in Egypt on his way to America, the news reaching us just as we go to press. Mr. Gibb was one of the best known horticulturists in the north, and his death, in the prime of life, is a sad and irreparable loss. He had been to China and Japan to study the horticulture of those countries. He died March 8, aged 45 years.

Don't be in a Hurry.—The middle of May generally finds us anxious to put out our plants, especially as we want to clean house, and the prepared garden beds look bare and forlorn. A cold, long rain storm often sets in the last of May, and our poor plants are shaken by the wind, perhaps stripped of their leaves, and need a month to recover their good looks. Let us not therefore be in a hurry, and let us bear in mind the rule about taking down stoves, and taking off flannels. Some one asked an old doctor what day in the year he should take off his woolen undershirt. The O. D. answered the 31st day of May. "When shall I put it on?" was the next question, "the first day of June," was the answer. I plant my seeds in shallow boxes, placing them in sunny windows, and transplant as they grow and crowd together. I cover the boxes with pieces of cloth, and like this better than glass. If the seeds are very fine, I keep the cloth wet. A pair of iron brackets are cheap, and fastened in the sunny windows, with a board laid across, they afford a nice support for my seed boxes.—SISTER GRACIOUS.

A Trap for Snails.—I have a glass case for ferns, but the snails have given me much trouble, in spite of sifting the earth before the plants were put in; moreover the glass was smeared over with their tracks and looked badly. The leaves of the *Begonia Rex* were riddled, and some of the rare ferns were bitten off, or hung in shreds. The family took turns watching for the "varmints," but they knew too much to appear in the daytime. An effective trap was discovered accidentally. I planted some fern seed in a flower pot saucer and put it under the glass. Next time I took it out, I found three fat snails on the bottom, and next day some more. I examine the case every day and the number grows less and less; I shall get them all in time. The ferns and begonias look much better; my trap is a success.—SISTER GRACIOUS.

Carnations to the Fore Again.—Few florists' flowers are in such demand as the carnation, and none, relatively bringing such high prices. Only a few years ago, the rose drove the carnation from the market, prices were not renumerative and its cultivation was in a great measure abandoned. Now, the prices for long-stemmed flowers are nearly the same as for the more common of the tea roses, and the few successful growers are reaping a harvest. There is not a flower in the market the growing of which pays so well to grow, or entails so little trouble. Its requisites are plenty of light, and a cool place for growth; no artificial heat should be employed, except enough to keep out frost.

Soil for Plums.—As a rule, the clay loams are best for plums. Sometimes the soil has a great influence upon the quality of the fruit. George T. Powell relates a remarkable instance of this. The Lombards sent to the New York market from the west shore of the Hudson "stand up" better, and bring a better price, than those from the east side, because the soil is clay on the west and sandy or gravelly on the east.

Plums for Oswego.—Oswego, New York is a favored plum region. Although plum growing is in its infancy there, about 20,000 bushels are marketed each year. Mr. J. Hagerty, a very large dealer and handler of fruits in that city, gives the following list of the best plums for his region: German Prune, Bradshaw, Yellow Egg, Damson, Reine Claude, Purple Egg and Lombard.

Culture of Water-Cress.—Select a level piece of land, with a stream running through it. Mark out the beds, 5, 10, 15 or 20 feet wide. Dig out all the soil from one to four feet deep, according to the locality. Dig out the beds six inches deeper than water freezes in your locality, so you can fill your bed with water that depth in the fall; then the roots of the water-cress will not freeze during the winter. If you have to dig the beds more than one foot deep, I would advise you to make the beds 15 or 20 feet wide. Drive some cedar posts into the ground five feet apart each way, so that they stand eight inches high; upon them place planks 12 inches wide and two inches thick. These are to walk upon, so you can pick the water-cress without getting into the water or bruising the water-cress, as it does not do to be roughly handled. If the land slopes much, you must leave a narrow mound of soil across the beds at short distances, so that you can keep the water at a regular height. Cut a narrow opening from the brook to let the water into the first bed; also cut a narrow channel through each mound, so you can have running water gently passing through all the beds and out of the last. Keep the beds from two to three inches deep with fresh running water, and you will have highly flavored, crisp water-cress. A sandy or gravelly bottom suits water-cress best, and an occasional fertilizing with some manure-water during the summer will increase the quantity and size.

Procure some seed from a seedsman. Sow it the last week in July on some damp piece of land, or anywhere else will do if kept moist by watering. It will soon germinate. When the seedlings are large enough to handle, take them up and plant them singly in your beds one foot each way. Turn the water into your beds to the depth required, and nothing more is to be done till the fall, when you must see that the beds are filled with water to a sufficient depth to protect the roots from freezing during the winter.

If there is any water-cress in your neighborhood, you can cut the branches off and trim them the same as a pansy cutting; take a pointed stick and plant them in the soil of your cress beds, one foot each way, the same as you would lettuce or cabbage plants. They will root at every joint; in fact, all along the branch. It would be a good plan to let the water out every two or three years, pull up all the water-cress, roots and stems, spread a little rotted manure over the beds, then plant it with fresh cuttings or rooted plants. By this means you will have fine deep green, broad-leaved cress, with larger sprays.

Cut the bunches off with a pair of scissors, or pinch them off with the thumb-nail. Be sure not to pull up the root. Get some bass or tying-grass, cut it into suitable lengths, and as you pick the water-cress, tie it. Dip the bunches into water, then put them lightly into large, open-sided wicker baskets, not packed, so that the air can pass through to keep them from heating. In this way it will keep fresh and green.

With well made cress beds, watered by a slow but continual stream of fresh water, cared for like other crops, picked carefully, and near a large city like Chicago or New York, cress would bring a return of from $2,000 to $3,000 per acre.—G. M. STRATTON, *Minnesota*.

Late Cauliflower.—The cauliflower prefers a deep, mellow, loamy soil, one that has not been previously occupied by any rapid growing crop, and it should be given a good dressing of thoroughly decayed stable manure, plowed under as deeply as possible. A thorough harrowing should then be given so as to level the ground. Mark off into rows two and a-half feet apart each way. At each intersection a good handful of some concentrated fertilizer is scattered and thoroughly intermixed with the soil by means of the hoe; at the same time a slight hill is formed in the center of which the plants are to be placed.

The crop should be planted just before or after a rain, care being taken to remove the plants carefully from the seed-bed. In planting, set the plant down to the seed-leaf, no matter how long the stems may be, and firm the soil well around the roots.

I find it to be very satisfactory to make at least three successive plantings, one about the 4th of July, another about the 15th, and the remainder of the crop some 10 days later, equal quantities of each variety being set at each plantation. After growth commences, the plants should be well cultivated. At each hoeing let a little fresh earth be drawn up around the plants. As soon as the heads commence to form in September, turn a few of the outside leaves over the heads; by so doing they will grow more compact and white.

The plants can be obtained by sowing the seed on a nicely prepared border about the 10th of May. The seeds should be sown very thinly, in drills about a foot apart. Cover slightly, and just as soon as the young plants make their appearance, they should be dusted with soot or tobacco dust to prevent the attack of the flea-beetle.

For this late crop, the Large Algiers and Thorburn's Nonpareil are the varieties usually employed.—CHAS. E. PARNELL, *Queens, N. Y.*

"Bacterial" Diseases in Corn.—Mr. Wing's statement (p. 188) reminds me of a recently published statement of a man who could see no good in ensilage, for he could "see the microbes with his naked eye" in it. Bacteria don't lay eggs and hatch out maggots.—W. F. MASSEY., *North Carolina*.

Three Best Plums.—Charles A. Green names the three best market plums for western New York as Bradshaw, Lombard and Reine Claude.

Hawthorne as a Entomologist.—Nathaniel Hawthorne's Uncle Manning was a horticulturist, and in the spring of 1822 was much troubled by an insect which attacked his trees. Just at this time there appeared in the *Palladium* newspaper a minute description of the insect, its origin, progress, and the best method for exterminating it. Mr. Manning was so pleased with the article that he ordered several copies of the paper for distribution among his horticultural friends. At this time Hawthorne was a student at Bowdoin College, and happened to arrive home just when his uncle was receiving the paper, and commenting freely on the article. Hawthorne said to a young friend, 'I wrote that article.' 'But what do you know about bugs?' inquired his friend. 'Nothing,' was the reply; "I wrote it to pass away an idle hour, and it was entirely made up from my imagination. Now, if Uncle Robert should find it out, he would be very angry; so you must keep my secret." *Lewiston Journal.*

The Magnolias will give us no flowers this year, if the noble specimens on the Manice estate at Queens, L. I., represent the class. The buds of these are all dead; as far as can be seen there is not an exception. The same is true of many of the spiræas and other flowering shrubs. This is, in part, the result of our late warm winter.

Roman Hyacinths.—The French growers of these bulbs have formed a syndicate with a view of saving the enormous profits heretofore made by the French merchants at the expense of the producers. The growers attribute the falling off of their sales to the high prices charged by the merchants. So far as this country is concerned this supposition is a mistake. It is not the price that has retarded the sales, but the fact that the Roman hyacinth is no longer in fashion, and that among us fickle caprice governs the price of all flowers. If the flowers were in demand the florist would gladly pay the price. At present it would not pay to grow them if the bulbs could be had at $10 per 1,000.

Golden Sugar Corn, is without exception, the most delicious sweet-corn we have ever tasted; for sweetness and richness it has no equal, and it is one of the earliest as well. We shall plant no other this season, and to keep up a succession we shall make several plantings. This must not be confounded with the variety known as New Gold Coin, which is of the same color, but larger and later, and our experience with it last year was not satisfactory, for it was deficient in the qualities that go to make up a good table variety, richness and sweetness. We may be mistaken in the quality of this variety, and, when grown under different conditions, it may be desirable. With us it was not.—QUEENS.

Hydrangea Rosea seems a misnomer at first glance, for the flower is a very deep and vivid blue, far darker than *H. hortensis*. The specific name is no doubt applied with reference to the foliage; the stems and veins are a bright rosy tint, deeper and more distinct than in any other variety.

Justicia Carnea is a handsome stove plant, familiar to the older generation of gardeners, which has terminal spikes of beautiful deep flesh-pink flowers. This is a fine addition to the sub-tropical garden. Experiments are constantly increasing the number of stove plants which bear out-door use during the summer. There are a good many showy Justicias, which could doubtless be used in sub-tropical bedding. These plants belong to the Acanthaceæ.

Seeds in Dated Papers is the subject of a short article in one of our valued contemporaries, the *Country Gentleman*, written to show how much the buyer suffers at the hands of the merchant in the purchase of old seeds. It does not state the case fairly, or rather fully. In the first place, no seedsman, worthy the name, ever sends out seed without sufficient vitality to germinate satisfactorily. Seeds may be bought at a country store where they have been kept so long as to have outlived their usefulness, but that is no place to buy seeds. The place to buy seeds is at the seedsman's. But the most important query is, are seeds not as valuable when old, even though not more than two per cent. of them germinate? Now, it all depends upon the seeds. All vine seeds are greatly to be preferred when several years old, as they produce grapes with more flesh and fewer seeds than perfectly fresh seeds. Of many kinds of florists' flowers what are considered perfect specimens—very double, cannot be produced unless the seeds are old. Many of our market gardeners buy a sufficient quantity of cabbage seed, as well as other sorts, to last several years, in order that they may know what they have, and many of them find that they get better vegetables from old than from new seed.—C. L. ALLEN.

Good Decorative Plants.—Several of the tillandsias and other nearly allied bromeliads will be found useful in the house or for decoration. The queerly barred *T. zebrina* is always admired for its odd, snaky marking, and it bears the dry air of a room excellently. Stand it in a bed of lycopodiums, and the contrast with the soft green is very striking. Others of the plain green foliaged tillandsias will be found very decorative, especially when bearing their flaming spikes of odd flowers. —E. L. T.

Growers of Azaleas for decorating purposes rarely go in for a large range of varieties; less than a dozen sorts, well chosen, fill their needs. Madame Vandercruyssen is a first-rate trade azalea, with flowers a clear rose, well set and profuse; clean good foliage, a good habit, and good constitution. Bernard Andreas is a favorite red, and B. Andreas alba takes a good rank among whites. These three are always favorites.

Money in the Soil.—At a recent New York institute, a well known horticulturist related his experience for ten years. He began with a run down 50-acre farm, encumbered for $8,500, and he had no money to stock it, and he was inexperienced. He grew small fruits and plants. In ten years the sales from that farm have aggregated $100,000.

Sweet Corn and Climate.—I notice that THE AMERICAN GARDEN is quoted as saying that sweet corn grown on the south side of Long Island is not as good as the same variety grown elsewhere; the difference being attributed to climatic conditions (see AMERICAN GARDEN, Feb., p. 118). While I have no doubt that climate has something to do with the quality of sweet corn, yet I think the nature of fertilizer and cultivation has vastly more to do with it. I have raised sweet corn for a number of years at Pearsall's, L. I. I have planted nearly all the new varieties, but have found nothing better than the famous Squantum or Potter's and Stowell's Evergreen. Either of these varieties grow to perfection on Long Island. I have eaten the Squantum at the famous Rhode Island shore dinners and other varieties in various parts of the country, but I have never eaten sweeter or better flavored corn than I have raised myself on Long Island. I have noticed that certain conditions of the atmosphere, especially during the warm, damp, muggy nights of August, seem to have much to do with the quality of sweet corn. It may be that the sea fogs of the coast at Marblehead, Squantum and the south side of Long Island, may favorably effect the quality of sweet corn. The best sweet corn I have ever eaten was "nubbins" from a standard late planting. The variety was, I think the old-fashioned Minnesota.—J. H. GRIFFITH, *Barrington, R. I.*

The Luculia Gratissima, many growers complain of difficulty in propagating. It is the handsomest and most fragrant of all greenhouse shrubs. As a rule, imported plants are very weak and spindling, giving no chance to obtain cuttings. The first thing to be done with them, says a successful grower, is to plant them out in a bed, in some cool house; a camellia house is just right. There must be plenty of room, for the plants will grow to a height of three feet. Treated in this way, they will soon make abundant growth for stocks. They are propagated by cuttings. Unsuccessful growers complain that these will not strike. My authority says they will strike as easily as geraniums, but the plant has one peculiarity; the cuttings must be put in the propagating bed *just as soon as they are taken off the plant.* If they are allowed to lie around, even for a short time, they will not strike. Anyone who has seen a big luculia, with its masses of exquisitely fragrant pink flowers, will wish that the simplicity of its culture were better understood.—E. L. T.

Amaryllis, J. R. Pitcher.—B. F. Williams, the well known grower of rare plants, has named one of his seedlings after our enthusiastic orchid grower, J. R. Pitcher, esq. We are pleased to see his name associated with so beautiful a flower, which is described as follows: "There is something very striking in the color of this garden variety. One need not look inside the flower to see this color, for both sides, including the tube, may, for the want of a better term, be described as of a rich crimson red. The tone is exceedingly dark, so that, on the whole, the variety is notably distinct, notwithstanding the number of kinds in cultivation."

The Jessie Kerr Peach.—My attention was called to this peach about six years ago in the catalogue of a prominent nursery firm at Huntsville, Ala. It was described as being a "freestone," but this nursery was careful to say that the description was that of the originator. The year following I bought six trees from them, and two years ago they bore their first fruit. I judged by its growth, foliage and blossom that it was very similar to, or identical with Amsden, and others of this worthless class. I had great hopes that the fruit would be freestone, but in this was disappointed. In color, shape and size it is an Amsden. It also clings to the stone badly, and rots just as quickly as all the following sorts: Gov. Garland, Arkansas Traveller, Amsden and Alexander. The season of ripening of all these varieties here, is about May 12, and the difference between them is about ten minutes. No doubt a freestone peach ripening at time of the aforementioned sorts would be a boon to the fruit grower, and we are now testing the Red Ceylon, which is being sent out by Reasoner Bros., of Manatee, Fla., with the hope that it will ripen and withstand this climate.—C. P. BAUER, *Judsonia, Ark.*

Native Flowers in the South.—We have many native plants here, out of which I believe an enterprising florist could make money, by shipping them north. In one of your recent issues I see the sacred lotus of India advertised. This plant grows by the thousands, even by the millions here. I have seen lakes three miles wide and 20 miles long completely covered with this grand aquatic plant. It is indeed a grand sight to see a lake 20 miles long filled with this tropical foliage, with its beautiful flowers towering above. Here again is a chance for some one with enterprise and a little money. I have seen both white and pale orange colored flowered varieties, and have been told of a variety which has pink flowers, and I see the variety advertised at $4 each, for plants with pink flowers. A beautiful gray moss or lichen grows on the trees in abundance, which is much prettier than the Spanish moss, and I think that it would please northern decorators.—J. L. NORMAND, *Marksville, La.*

[NOTE.—The water lily to which our correspondent refers is probably a native species, *Nelumbium luteum,* not the oriental lotus.—ED. AM. G.]

The Japanese Cypresses (retinispora) are very difficult to classify, and sport greatly. The opinion of many experts that all the so-called retinisporas are only sports of one species is made probable by the surprising reversions of the garden sorts to the simpler forms. A large tree of *R. squarrosa,* 10 feet high, near here, has two main trunks, one of *R. squamosa Veitchii* and the other a very blue form of *R. pisifera.*—F. L. TEMPLE.

Not Manettia Cordifolia.—The Manettia mentioned in March issue (p. 181) as brilliant scarlet, tipped with yellow, is *Manettia bicolor,* not *M. cordifolia.* The latter is all red, and not so strong a grower as *M. bicolor.*—DAVID GINDRA.

Forcing Christmas Roses.—Experiments were made last winter in forcing Christmas roses (Helleborus) for the New York flower market. They appear to sell in England, but do not take at all here, not being sufficiently showy. Some of them are pretty enough, but a great many are very weedy, the colors being undecided and dingy. They can never compete with brighter flowers.

Skunk Cabbage (*Symplocarpus fœtidus*).—This despised native plant has a prominent place in English gardens, not in every flower-garden, but in large borders and shaded places; and why should it not? If there is a more beautiful or interesting flower than this, we have not seen it. Besides, its flowers are among the first in the spring, and of a color rarely met—a bronzy purple marbled with green. To be appreciated these must be examined closely, then they present attractions not possessed by the more showy and popular sorts. For a wet situation we should say, by all means introduce one of these noble plants. If it only had a foreign air everybody would grow it. It would not be "Skunk Cabbage" then.

Tree Pæonies (*Pæonia Moutan*).—We shall be obliged to do without these beautiful flowers this season. The warm weather in February, followed by the severe cold weather in March, killed the flowering buds, and to all appearances the plants. We do not despair of the latter, for if there is any plant that cannot be killed it is the pæony. It will resent bad treatment by not flowering; but die it will not.

Lilies not Hardy.—The open winter has fairly proven our oft-repeated assertion that lilies are not hardy, and that if we want them to come up to their full measure of strength and beauty, we must protect them against freezing. The past winter was so mild that protection was unnecessary, and the plants now show the effects by a unprecedented growth. *L. candidum*, the finest of all garden lilies, is showing most wonderful strength. We have no doubt but the disease which has been so destructive to this lily the past few years is due to the freezing, which has impoverished the bulbs. In planting one should select a place where there is good drainage, or where the water will not stand around them; this is as injurious as the cold. Most lilies are indigenous to dry soils, but those found in swampy grounds are benefited by giving them a dry situation. This is particularly true of *L. superbum*, which will grow taller and stronger in dry soils, if mulched both summer and winter, than in its native habitat, the swamp.

Growing Geraniums in Water.—The correspondent whose faith in the difficulty of growing geraniums in water was shaken because his wife had made some successful hits in growing them in old tomato cans, is more easily influenced than I. In spite of his conversion, I have concluded to let my potter continue awhile longer to make holes in the bottom of our flower pots. —THOMAS MEEHAN.

Late Chrysanthemums.—About two years ago I got a dozen chrysanthemums from Mr. Henderson; amongst them was one the label of which I lost. It did not flower that year, but the next year it bloomed about Christmas. Last year I kept my chrysanthemums in the cold-frames under double sashes until the middle of November. As a result it is blooming a month later than usual, January until now (February 20), and the plants have now from one to two dozen buds and blossoms on them. The plant is erect in growth, rather tall growing; the flowers when half open are discolored in the center, but when fully open are pure white. It is a Japanese variety; does not take a very large pot, about an eight inch pot being large enough. I have another white variety which bloomed in November, and now it has a second crop on, some two dozen blossoms and buds; it is of a trailing habit and low growth. If any of the readers of THE AMERICAN GARDEN have had a like experience I would like to know.—J. BEBBINGTON, *Nebraska.*

Climbing Hydrangea (*Decumaria barbara*).—Oh the beauty of the almost unknown, unappreciated, American climbing hydrangea! Why is it that so many rarely beautiful native plants are unnoticed, while less intrinsically good imported varieties sell so readily? Eight years ago I paid $3 per plant for climbing hydrangeas, which had been imported from Japan at great expense; while a far superior variety, native to the south, was unnoticed. To-day many plants of this American variety are in full flower, perfuming the air with their myriads of blooms. Spartanburg is near a bold water-course, on whose banks are found many rare and beautiful flowers, prized in our best gardens; but none are so beautiful or so little known as the climbing hydrangea. Over the stream is a long bridge, on whose stone pillars the hydrangea is clinging like a green veil, covering and beautifying the rough stone-work. In time it will, if left undisturbed, cover the whole frame-work. Near this is another which must be fully 50 years old, its trunk measuring at least two inches in diameter; after clambering to the top of a large elm tree it straggles on to smaller trees—hollys, elders, persimmons, etc., forming a jungle of beauty rarely met with. Under it grow crow-foot, violets, habenaria, ferns, woodbine, yellow jasmine, chionanthus, kalmia and other wildlings of our forests. To-day the hydrangea from the ground to the topmost limbs is one sheet of bloom, flat-cymed, cream tinted, lace-like and fragrant. For its exquisite beauty and grace this plant deserves to be widely introduced to the flower-loving world.—J. S. R. T., *Spartanburg, S. C.*

Jerusalem Artichoke.—This is a peculiar plant, or vegetable, whichever it may be called. In some sections of the country the cry comes; how can we exterminate it? from another comes the query; how can we grow it? It is said to be a valuable crop for stock feeding, a delicious salad, or good as a vegetable; then again it is called a pest, a worthless weed. Which is it?

A Grand Floral Exhibition to Be, is the one now under consideration by the New York Florists' Club. They are at work in a way that will win. Each member is allowed the privilege of subscribing a given sum, and cannot go beyond a stated amount, and all are on terms of perfect equality, while a subscription is not compulsory. Any member can offer a prize of any amount and for anything he chooses, in flowers, fruits or plants, and for this purpose the members are responding nobly. An amazing array of premiums will be offered, and on the day of exhibition there will be such a show of flowers, fruits and plants as cannot be made outside of the metropolis. When the florists become interested, as they now are, their liberality, ability as growers, the unlimited means at hand, together with their taste and skill in arrangement, will unite in giving an entertainment never before equaled in its way.—C. L. A.

Coleus for the Window Garden.—There are but few plants better adapted for the window garden or living-room than the finer colored varieties of the coleus. The larger leaved and more highly colored forms seem more at home in the house than those that do best out of doors. The heat which is so injurious to many house plants is just what the coleus enjoys. We have never seen finer specimens in the greenhouse or on exhibition, than we lately saw in a farm house window, with a southern exposure. The temperature of the room was always high; never below 60° at night, the heat being furnished by an ordinary coal stove. The plants were started in September last from cuttings, which root freely in water. When well rooted they were transferred to tin cans, fruit size, in which we saw them growing. When six inches high the ends were nipped, and they branched at every leaf. These branches in due time were nipped, and the plants are now regular in outline, completely clothed with the most gorgeous foliage, and without exception, the handsomest window plants we have ever seen growing.—C. L. A.

Algerian Locusts.—The unseasonable weather of the past winter has had a malign result in Algiers and Tunis, for the locust pest threatens to be more terrible than ever. The insects put in their appearance discouragingly early, being already at work in February, notably in the province of Constantine. The Algerian officials have made arrangements, as in the two past years, to attack the enterprising locusts, tooth and nail, from the beginning of their egg-laying.—W. H. W. C.

A White Erythronium.—In a late issue of the GARDEN a writer speaks of the dog-tooth violet, *Erythronium Americanum*, as yellow in bloom. On our hill-sides we find this little gem in profusion, but there are fewer yellow than brown, white, rose and pink; some are solid-colors; others splashed. They grow deep in a shady, rich soil; but nature has withheld from me the secret of transplanting them successfully; all I have handled have died.—WILD, *Cloverport, Ky.*

[This white form is not uncommon in various parts of the country, particularly in the west.—ED. AM. G.]

London Purple and Foliage.—Much of the injury to plum foliage which has been attributed to London purple is found to be due to the shot-hole fungus (*Septoria cerasina*). This fungus produces a premature falling of leaves, and is often very serious. The leaves are marked with circular brownish spots, and these spots eventually fall out and leave shot-holes.

Harvard's Garden of Glass. The botanical department of the college has been receiving during the year a very valuable collection of glass flowers. They are made by a secret process by a firm named Blatchka, consisting of father and son, in Dresden, Germany. The flowers are of exquisite workmanship, and cannot be distinguished by the eye from the real ones. These flowers are the only ones of the kind ever made, and the firm has agreed not to manufacture for any institution but Harvard College. Three or four hundred specimens have now been received. The collection when complete will illustrate all the families of plants in North America, all economic plants, and the more important of the lower plants, including enlarged parts and sections of the finer details of plants for study. Mrs. Ware, of Boston, is the donor of this valuable addition to the facilities of the university.—*N. Y. Tribune.*

The Season in the South.—The "Sunny South" has deserved its title this season, at all events; day after day and week after week, we have enjoyed clear, balmy spring weather, with no suggestion even of winter. Heavy dews alone have kept the delicate plants alive and enabled the trees to don their spring attire a month ahead of time. By the third week in January, the gardens of Savannah were bright with anemones, roses and azaleas, in addition to their wealth of japonicas and the usual winter blooms, and the Charleston gardeners were gathering strawberries on the 20th of February. One florist of the latter place had eight acres of roses in full bloom; a gentleman of Savannah was gathering magnificent specimens from his bushes. Capt. Christy, Souvenir, Safrano, Marie Van Houtte, Marie Henriette, Mermets, Maréchal Neil, etc. The flowers, however, though full size, fragrance and color, were very perishable, owing, doubtless to the lack of rain. The woods now, February 27, are fragrant with the yellow jessamine and swamp azalea, and bright with the red maple, judas tree, dog-wood, fringe and spiræa; while the ground is covered with violets and other modest blossoms, all a month or six weeks ahead of their season. Fruit trees are in full bloom, while Japan plums are ripe and of full size and flavor.—M., *Savannah, Ga.*

The Phylloxera in Europe.—The French vintage of 1888 was good, both in quantity and quality, and the vineyardists were greatly cheered by this fact, and by the encouraging progress made in combatting the phylloxera. But the official report for 1889 is not so agreeable. The phylloxera has extended its ravages, and has, during the year, invaded three new departments, Aube, Carthe and Haute Marne.—W. W. C.

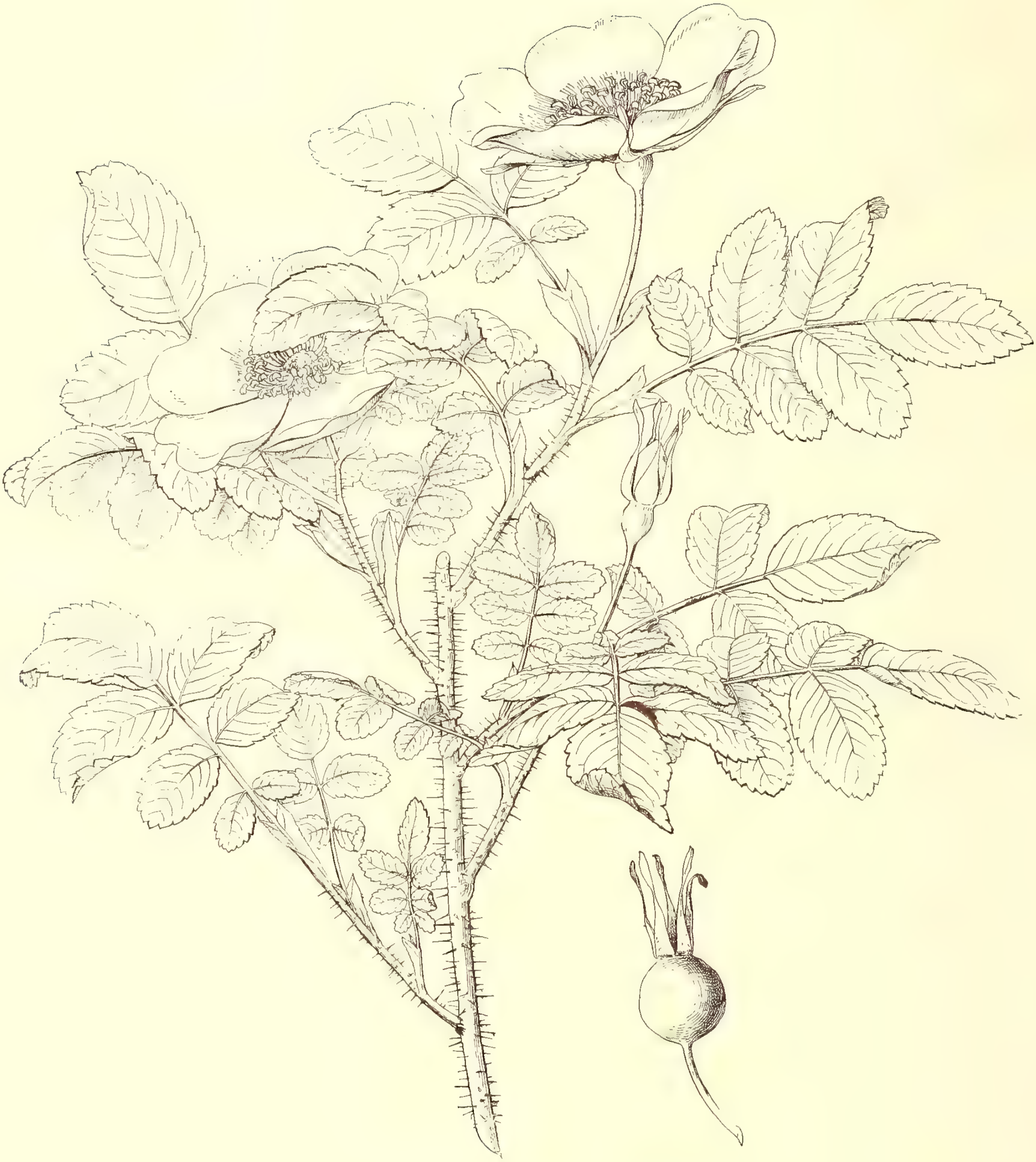


PLATE I, SAY'S ROSE—*Rosa Sayi.* ¾ NATURAL SIZE.

HABITAT: Plains and swamp margins from Michigan to Colorado and northward. A comely wild rose, three to four feet high; a free bloomer. See page 321

The American Garden.

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CLIMATE AND ITS RELATION TO LIFE.

IT IS NOT without reason that the staple salutation and customary inquiry are concerning the weather and one's health. In all ages, in every clime and in every stage of society, the primary basis of converse and the preliminary discourse include these two topics. This fact has been the subject of a vast deal of criticism, but neither sneer nor logic nor philosophy can put it down, because these topics are the essential foundations of existence, the fundamental factors in climate and life. Weather prophets will always have consideration; whatever will promote life will have attentive audience. No advance of civilization can take men far away from their physical nature and the conditions in which it can best thrive. There are, therefore, such relations between the two, climate and life, relations so exacting, so certain, that in principle they constitute a law, which if found, with its limitations and modifications, must prove of supreme importance.

This is as true in vegetable as in animal life. The life principle is essentially the same in plant and animal. We have kinship with the growing plant. We mourn over the untimely frost. It extinguishes life, a life so common to both that its loss is to us an affliction which almost approaches sympathy. We have no sympathy for stones. Plants, according to their species, demand a congenial clime; so does man, though his intelligence enables him, in a measure, to surmount the disabilities of an adverse one. He can construct a house and build a fire. To a degree he can make his own climate. Without this power of modification he would die as surely as the plant away from its proper home. Notwithstanding the faculty which so largely distinguishes him from the vegetation around him, the zones conspire against his highest efforts, and fill his blood with elements so different, and put into his physical constitution impulses so diverse, that the varieties of mankind approximate those of any known plant. What is that subtle influence, that in spite of himself holds a mastery over him and changes his nature?

Vegetable life is more at the mercy of the climate. We say that man is cosmopolitan because of his power to modify his surroundings. Vegetation, not having this power, has a limit much more restricted. A thorough knowledge of this limit, not simply of plant existence, but of its highest production, is worthy of all that observation can find, experience demonstrate and science bestow. Given a plant useful for man and beast, with a knowledge of its characteristics of growth and maturity, where shall it be planted? Can we so far get a insight into the relations of climate to life that we can, *a priori*, determine the habitat of any given plant or animal?

Mere observation will not determine it. Nature has a way of crushing out the life not adapted to any given locality, but the study of a single map in her ample book in search of what she *can* produce in the region delineated, judging only from what she *does* produce, would make short shrift of the student who limits his knowledge to observation. Because the potato and tobacco plants were found in America and not in Europe, it did not follow that Nature forbade their cultivation in the Eastern Hemisphere. Rabbits were plentiful in England, but none were found in Australia. Nature did not produce them there; but that did not prevent them from becoming, when transported, a pest that millions of pounds

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sterling have failed to exterminate. They thrive there far better than in their supposed habitat. It is said that there are no snakes in Ireland. If so, is there any reason (barring the edict of St. Patrick) why they should not live there? These few illustrations out of many are cited to show the delusive character of facts when isolated from a consideration of conditions. When all the conditions in these cases, as well as others of a like nature, are known, there is found to be ample reason for the non-production, without impeaching the general law that plants and animals will not exist in an unfavorable climate.

Why are there no trees on our vast western prairies east of the arid belt? Some insist that tree planting on them will never be a success, for the reason that Nature would have placed them there if adapted to their growth. Others again contend that fires have for ages swept over them and kept the forest in check; others that the soil is too loose and not of a character fitted for tree life. The fires are largely diminishing, and the soil, especially in the eastern part, is from cultivation becoming compacted, and yet there is no essential natural change in the forest area. Others maintain (the most probable cause) that the heavy winds are destructive to all vegetation except the lowly kind that can bend to the storm or lie beneath its mighty path. If the latter is the chief cause, it but further exemplifies the law of adaptation. The United States could well afford to pay a large sum to be assured of the true cause. Is the cause permanent or incidental? There is some evidence of a change, in that as the area of effort to grow trees increases, the better is the growth assured. Man may in time change the conditions, but the years will be heavy before a sufficient wind-break can be placed in the horizon of the blizzard. That is, "perhaps," for I do not know.

If observation alone cannot determine the adaptability of vegetation to locality, experiment can. But experience is a dear school. In a large measure it is empirical—governed by chance. When experiment is guided by an accurate knowledge of the constitution of the subject and a conception of the conditions necessary for success, coupled with a full understanding of the soil and climate to be tried, the outcome may be predicted. Disregard of all these conditions has wasted the substance of many an experimenter and brought down many high hopes.

Most of the disagreements of the world come from half statements, or from a half conception of full statements. So most of our failures come from a partial misunderstanding of requirements of success. If we knew all the facts in regard to the constitution of a plant, and well understood the soil and climate, we might order its transportation and propagation with as much certainty as the astronomer can predict the orbit of a planet. The most learned can be misled, as well as the most ignorant, by the want of reliable data. In 1856, the learned Joseph Henry, for many years the secretary of the Smithsonian Institution, whose repute was justly world-wide, wrote, "However large our domain really is, and however inexhaustible it may have been represented to be, a sober deduction from *the facts which have accumulated during the last few years* will show that we are nearer the confine of the healthy expansion of our agricultural operations over new ground than those who have not paid definite attention to the subject could readily imagine. We think it would be found a wiser policy to develop more fully the agricultural resources of the states and territories bordering on the Mississippi than to attempt the further invasion of the sterile waste that lies beyond."

It is still an open question with many whether it would not have been a wiser policy to restrict our agriculture to the region east of the line indicated by Professor Henry, but the millions who have invaded that "sterile waste" have paid but idle heed to his advice, and their abundant agricultural products, both vegetable and animal, have played havoc with the older states and their agricultural resources. It will not be many decades before the center of population will approximate the line which to him was the western limit of economic agricultural possibility. He was right in his conclusions based upon the facts then known to him, but at that time little was known of the "Great West." No one imagined that there were valleys in and beyond that "sterile waste" which would in the future rival Egypt, and whole states that then were supposed to be worthless except for the precious metals, which a generation later have an agricultural production that far out-ranks that of the mines. Who then supposed that the valley of Peace River, in the province of Athabaska, British Columbia, ten degrees north and fifteen degrees west of St. Paul, the supposed utmost verge of profitable cultivation, would produce a spring wheat that challenges in yield and quality the best wheat grown elsewhere in the world! Who conceived it possible that the intervening thousand miles would become a wheat field that would unsettle the markets in Liverpool? The climate of that whole region was a sealed book, save to the officers of the Hudson Bay Company, whose interests lay in the direction of a concealment of the truth. Who supposed that one could start a plow almost as early there as at St. Paul? The conditions were unknown, and being unknown, all prognostications failed.

It is only recently that Europe has conceded that American wheat is more nutritive than European. It is harder, and has more gluten in it. Why? Is it because of the soil? French experimenters have sought without success to supply the missing quality by adding chemical elements to the soil in which it is grown. They will always fail, for the reason that this quality comes not from braying in a chemist's mortar, but from the alchemy of Nature that transmutes the wind and the storm and the sunshine and the very frosts themselves into a golden product. The trend even in America of the soft wheat to the hard, is from the southeast to the northwest, in the face, as it were, of the blizzard. It pays to study climate.

What is the secret involved in the change of seed? It is conceded that a greater yield results from a judicious change. That depends, however, largely upon the kind and quality substituted, and more especially upon the locality whence it came. The Norway oat raised the oat crop in the United States ten bushels to the acre. The best melon seeds for the northern garden are said to come from the south. Illustrations are so numerous in fruit and flower, in forage plant and in cereals, in fiber and in tuber, of the salutary effect of judicious change, that it is useless further to specify. What is that impulse that strews in its pathway a higher production? Does the unfolded germ bring with it a segment of the climate in which it grows at its best estate? If so, when does this impulse exhaust itself? What is the cause of seed "running out?" Does it ever run out under proper cultivation? It is said that the wheat of Egypt is the same as it was a thousand years ago, and just as prolific. Is that so because it is on "its native heath" and has a character formed—a constitution founded upon a thousand years of adaptation to the climate of Egypt? And is the reason why our seed runs out that it is an immigrant as well as the man who brought it? Why was it that the Norway oat so soon lost its power for increased production? Was it because the climate was less conducive to bountiful yield than its native one? How far is this true of all new varieties brought into different climatic conditions? To what extent is the Russian apple a success? How long will the Jersey cow remain a Jersey cow in the United States? Are imported qualities staying qualities? It is a grave question whether, in the long run, there is anything to be gained now by importing new varieties of grain and fruit. It is thought by many that the best permanent results will come by improving the present stock, by cultivating new varieties from the indigenous fruits and grains, and from the imported that have been with us so long as to be acclimatized. There is generally a weak point in foreign plants which has to be eliminated by culture here. The plants are apt to degenerate if at first successful, or to take on some disability not anticipated.

However these questions are answered, there is no doubt that our climate modifies man and beast, foliage and grain, and that the best results come from a proper consideration of like conditions, or better conditions. The potato is a better product on Lake Superior than in the Andes, its native home; but while through all its journeyings since it was discovered it has preserved its predilection for a cool, temperate climate, it has its choice of climates. Migration has improved the stock. On the other hand, Indian corn does not take kindly to Europe, though the thermal latitude in some parts would justify its culture there. It will grow there, it is true, and grow well, but not with such productiveness as in its native home, America. It has a choice of condition that cannot be decided by the range of the thermometer. Not heat alone, nor rainfall, nor sun exposure, nor altitude or latitude, nor any single element, but rather all combined in proper ratio, can safely determine where to plant, when to plant and what to plant.

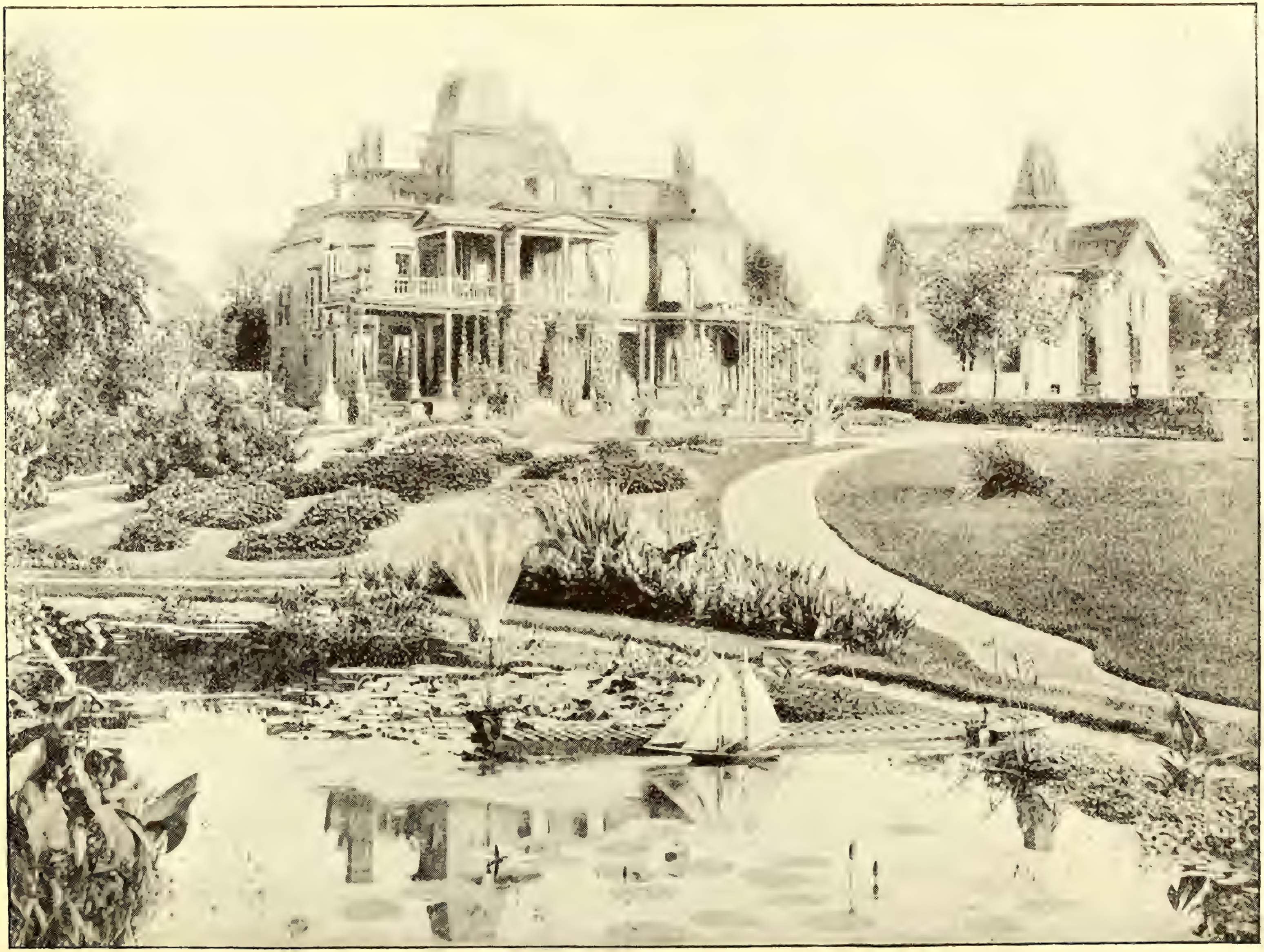
In the near future, it is inevitable that the scope of the work of the Department of Agriculture, in respect especially to climatology, will be greatly enlarged. Climatology, in fact, is only one branch of the all-comprehensive science, which passing events indicate is to spring from the co-ordination of many kindred branches, now studied piecemeal in the Department of Agriculture, and which will have for its purpose the better knowledge of our country's biological possibilities. Not long since, a beginning—a preliminary test—was made by Dr. Merriam, chief of the Division of Mammalogy aud Ornithology, under instructions from the honorable Secretary. This gentleman was sent to the San Francisco mountains, in Arizona, the highest detached group within our borders, and the one for this reason which furnished the best opportunity for the comprehensive study of the effect of climate upon animal and vegetable life. Surrounding the apex of the parent peak—an extinct volcano—he found a region, the fauna and flora of which were similar to those of

Labrador and other high Arctic and Antarctic latitudes; while below, and within the limits of a single glance, the climate passed through all the varying phases of the temperate and semi-tropical regions. To a trained observer like him these presented a thousand curious and suggestive aspects, which, by comparison with each other, led to the confirmation of certain theories and the refutation of others. How far distant may the time be, when with a given latitude or altitude, a given mean temperature and rainfall, the Department may say with an approach of certainity, of fruits and flowers, of vegetables, fibres, cereals, grasses, trees and animals, "This variety will, and this other will not thrive with you?"

The Department does this to an extent already, but its utterances too often lack the element of authoritative knowledge, based upon specific experimentation. The nucleus for the organization is ready in the Department, consisting of the divisions of Botany, Entomology, Ornithology and Mammalogy, Pomology, Horticulture and the Seed Division. It is proposed to add the Weather Bureau, and from present appearances it will probably be placed under the jurisdiction of the Department. Moreover, the experiment stations throughout the country are acting in more or less harmony with, and report to the Department; and the plan of co-ordinating the work of all these divisions and bureaus to a single central purpose has the platform for discussion and adoption; the plan of determining as far as possible the relations of climatology to life in all its manifestations.

It is proposed that all the agents of the Department shall investigate not merely with reference to their own specific work in the Department, but shall have the eye of observation ever open and the mind ever ready to see and to note these relations. In this study, every available source of information will be sought to be used. The Department is in intimate correspondence with a close scientific student in Queensland, Australia, who will report the climatic characteristics of that country, and will furnish the grasses and forage plants that apparently will be of service to the United States. Arrangements are being made for the collection of the flora of Alaska, and the Department has under consideration the sending of an expedition, sometime in the near future, that shall traverse Russia from its western to its eastern border. It has an agent collecting botanical specimens in South America. Agents of the Department are traversing this country from Mexico to our northern border, collecting the specimens that shall lead to a more thorough knowledge of the distribution of plants, mammals and birds. Agents of the Pomological Division last summer made a trip, beginning at Texas, thence through New Mexico, Arizona, California, Oregon and Washington to the northern border, and thence home, generally studying the habits and making collections of the wild grape. The head of the Division of Forestry made a similar trip, beginning in Colorado and thence west to the state of Washington, and thence to California and home by way of Arizona and New Mexico, for the purpose of studying the distribution of plants. The chief of the Botanical Division took a similar trip into western Kansas and through the same territories for the purpose of studying the character and distribution of the native forage plants. At present the facts thus gathered, except for their specific work, are not co-ordinated or brought together as a principle of law; but the purpose of the Department is to so organize the whole work as to enable it, with more certainty, to inform the world of the possibilities of the several localities in the country and the plants and animals that are adapted to them. If this plan shall commend itself to the practical and scientific men of the country, it is hoped that it will receive such encouragement as shall inspire the Department to go on, and that abundant means will be given to consummate it. It is hoped that these facts thus accumulated, may in time be reduced and brought into line, and that there shall come to the front some man who, with the spirit of prophesy, shall define the law which governs the relations of climate to life. We absolutely need an exhaustive work on the climatology of the United States.

EDWIN WILLITS.



The Garden Home at Canajoharie, N. Y.: Aquatic Garden in the Foreground.

HOW NOT TO DO IT.

SOME HELPFUL SUGGESTIONS IN URBAN ORNAMENTATION AND ECONOMICS.

OUR COUNTRY is young among nations, but it is old enough to have witnessed the rise and decline of towns whose stories are fruitful of useful lessons, if people would only heed them. Let us take a single example and call it Bolton. The place seems to have steadily declined, while others in the neighborhood, with fewer and less important advantages, have maintained or increased their prosperity. Social causes have no doubt to some extent produced these disastrous results; but why have they worked such evils here and failed to injure other places no more blameless? I maintain that it is because the Boltonians have followed false prophets and neglected and disfigured their natural advantages.

All towns, old and young, wish to add to the number of their desirable inhabitants, and resort to different methods of attracting strangers, and from these methods result glorification or ruin. The means in use at Bolton at one time attracted wealth and numbers, but refinement was not encouraged; the natural beauties were destroyed and replaced by no artificial ones. The broad, liberal and æsthetic policy inaugurated by the early inhabitants has been contracted or abandoned until in this generation the evils of the present policy are apparent to all; yet they cling to worse than dubious ways. Had the town been kept attractive, it would have drawn more than the wealth that has been employed to corrupt politics and society, and it would maintain its former high standing instead of being a reproach to its inhabitants.

Let us take a short review of its history, which runs back over two eventful centuries. The first proprietors, unlike those of most of our later towns, were men of wealth, refinement and education, liberal in their ideas beyond their own and our times, and able to make a practicable application of them as fine as it was unusual. Situated on a beautiful and well-wooded peninsula jutting into an arm of the Atlantic ocean, Bolton has a climate equalled by that of few places on our coast. Over two hundred years ago a royal engineer from England laid out a beautiful town, with wide streets at right angles, or in graceful, sweeping curves to conform to the topography of the district. Wise restrictions were placed upon builders, and although the land was valuable private property from the first, the proprietors gave a large and beautiful "common" for the use of the public as long as the town shall stand. Succeeding generations have allowed buildings to be erected on parts of this along some the street fronts, obstructing the view, occupying the land and presenting to the common the backs of foul and unsightly structures; and this was done while there was plenty of land the occupation of which would have preserved one of the beauties of the town. An old ordinance wisely declares that the streets running to the water should be kept open to the public forever. The beauty and fresh air the town derives from this source are a self-evident blessing. Yet the town itself violates this good provision by placing unsightly wooden buildings on the water fronts of two of the most populous streets.

The first proprietors set off a portion of their land, the income from which was to be devoted to the maintenance of schools. At first the only rental derived from it was a small one from pasturage or farming land, but the generation now living conceived the idea that by running streets through it and giving longer leases to householders the income could be increased. This idea, excellent in itself, was so miserably carried out, by cutting the district up into narrow lanes and miserable alley-ways, that only a poor class of people who are able to pay only small rents can be induced to live there, and as these have their leases the hope of improvement by adopting a better plan seems shut out for years.

The early inhabitants practiced horticulture successfully and profitably; fruit was abundant and the large surplus realized good returns when sent to other places. Now it is doubtful if anything in the way of fruit, except a few strawberries, ever finds its way to market from here. Although the few farmers and gardeners pay far more than their proportionate share of the taxes, their property being in full view and assessed at its full value, for it cannot be easily hidden from the assessors like stocks or bonds, yet so poor is the protection of the local police and so lenient the public sentiment towards fruit stealing, that the owners of once profitable orchards have cut them down rather than submit to depredations they could not prevent except by using firearms or maintaining a corps of watchmen.

No place in America once raised such root crops as Bolton, and no one was without employment who was willing to engage in their cultivation. Their potatoes and onions always found sale in the West Indies, even if not in our own cities. But the inhabitants, almost without exception, united in supporting the policy of that political party that has so effectually destroyed American commerce and given it to foreigners, until no vessels were found to transport their crops, and a once profitable industry died. The noble harbor no long shelters the craft that brought the people the riches of the tropics in exchange for their productions. The ruined wharves and decaying warehouses tell the story no less plainly than the grass-grown gardens and pastured fields, once models of cultivation and sources of abundance. A few old cultivators still continue their occupation, though it is unprofitable, but they can do nothing else. The young and enterprising have sought employment in other places, and the descendants of some of those who once flourished as the owners of the well tilled grounds, after vainly trying to stem the tide of fate, have become operatives in the factories that have been fostered to their cost. If the manufacturers bought what these people could produce, then they would have less cause of complaint; but the wealth and tastes of the upper class induce them to get the best from foreign countries, while the poverty of the gardener, operative and farmer compels them to purchase what they can get near at hand.

Their commerce and allied industries destroyed, the inhabitants thought they would encourage manufactures, and, having neither money nor knowledge of such business themselves, they invited others who were willing to invest their skill and capital to come within their borders by allowing them special privileges in the way of remission of taxes, etc., thus increasing the burden of the resident population, who soon found that in these rich corporations they had masters to whose control they must submit, and whose burdens they must bear. All sorts of expenses that conduced to the comfort or profit of these companies were imposed on the town, and no returns were made for the outlay. The newcomers had no use for the old inhabitants, except as taxpayers or laborers. They preferred to introduce a foreign population with all its attendant evils, for they did not live there, and, caring only for what brought profit to themselves, they were utterly regardless of the morals, prosperity or appearance of the town. True, a little more money was at times put into circulation, but it did not get into the pockets of the Americans, and it is doubtful if one family originally in the place is worth a dollar more than it would have been if no outside industries had been attempted there. These are now in a failing condition, and the population is steadily decreasing. Those of the original people who have not already gone from the place look upon their mortgaged grounds and can think of no way of lifting the load. Land that paid a handsome profit in the days of their great grandfathers does not now pay the expenses of cultivation, with no market for the crops. They think of Newport, which has flourished under a narrow but discreet policy, and wish their immediate predecessors had done more to attract desirable guests. Once the traveling foreigner visiting America was attracted to this place by its elegant society; but he cares not to come now to encounter vulgarity. The mild and healthful climate attracted people from many other sections, but now they go elsewhere, seeking places with a better reputation where annoyances will be less, while those who are not so welcome in the surrounding towns resort to this place and become a reproach to it.

I must maintain that had the original plans and policy of the town been adhered to, it would have retained its old standing and still be sought for its beauty and climate, even more than formerly, in spite of the drawbacks to which society is also subjected in other places. To cite some instances of neglect and maladministration: although the taxes are many times higher than ever before, the roads were never in a worse condition. Good road-building material is abundant, but drainage is entirely neglected; gravel and crushed stone put on the roadway often form only a dam to obstruct the natural drainage, until the overflowing water, perversely obeying nature's law in seeking its level, soon gullies out the roads so as to render them unfit for travel. Perhaps a few loads of gravel are put on to make the places passable, but it is only a question of time when that will again wash away. More money has been spent on these wretched roads than would be needed to macadamize every road in the township.

The early inhabitants planted trees—elms that now arch over and shade the noble streets, lindens, ashes and other hard-wooded trees—but the few trees planted by this generation are mostly soft-wooded things that when loaded with leaves break in the summer breeze, and cannot, like those planted in earlier days, go on increasing in beauty. If little that is commendable in the way of tree-planting, now occupying so much attention in wide-awake places, has been done by the present generation, it is deplorable to see the indifference with which they treat their beautiful inheritance. Crowded trees are allowed to remain, broken branches are not removed, but often a huge limb is hacked off to permit a view of what is passing in the street, leaving, in defiance of all principles of correct tree pruning, an ugly stump, the decay of which often causes the death of the tree. The bean-pole seems to have been the ideal sought by the average tree butcher. It is too much to expect that every one will have a just idea of the worth of trees, but not too much to expect that a people claiming to be civilized should show that they possess some notion of their value.

A good but ill-advised lady, desiring to benefit her towns-people by giving them a building for a public library, having a large and beautiful lot, affording ample room for the seclusion and quiet so appropriate to studious uses, erected the building so nearly on the street line that too little room was left for travel on the sidewalk between the structure and the huge trunks of two noble elms that had shaded the people for generations; so the trees were ruthlessly destroyed, and to gratify an unrefined taste one of the town's most beautiful landmarks was obliterated forever. But the culminatian of barbarism was a recent organized attack on the ancestral trees by direction of the town council, in the interest of an electric light company and against the rights of property owners. This venal body decreed that the trees should be robbed of all but their topmost branches to allow the inefficient lights to be seen, and in place of verdure and grace, hacked trees and ugly shapes remain to excite among visitors ridicule, pity and contempt. While other towns are burying the dangerous wires and getting rid of the unsightly poles that render them unattractive to people who can choose their own homes, this backward place sacrifices its renowned trees for the benefit of a company of speculators who care nothing for beauty or the preservation of rare traditions or the adornment of other people's homes. It is no wonder people no longer seek to make their homes in this once admired place.

It is not, however, to trees alone that Boltonians have devoted their destructive energies; the principal road in the southern part of the town skirts a beautiful bay, whose shores were once lined with picturesque rocks that gave an interest to every part of its graceful curves. "More money than brains" has been spent in destroying these beautiful formations and forming them into long walls and hideous lines. The encroaching waters have in some places rendered protection necessary to the banks, but a rough "rip-rap" wall would have been more effectual than the heavy masonry that has been put up. Part of this is finished by an ugly cement-coated wall, shutting off the view of the harbor and preventing the escape of water after rain. A light iron fence would have afforded the protection required without being a blemish on the shore. Why certain individuals have built heavy, expensive stone walls along the high-water mark, where no one ever crosses, "passeth all understanding," unless it was done for the benefit of the small boys who amuse themselves by running along the tops. In some places the owners have destroyed the green strips of grass between their sidewalks and the road and covered the space with coal-ashes or tar walks, and wonder why everybody does not admire their handiwork as much as they do. The beautiful old houses look weary in their incongruous settings, as if the time had come for them to abandon the vulgarity of their surroundings. The most conspicuous of these, from its size and position in the center of the town, is one of those beautiful creations of our early architects—adaptations of the French renaissance—that are admired by the ignorant and cultivated alike. Built before beauty of proportion was ignored, the elaborate details are all so subordinated to the general effect as to present a scene of classic beauty. Finely situated upon gently rising ground, the surroundings are disfigured by neglected bedding plants in the worst style of the modern florist. Beauty of form and plant life are unknown, Monstrosities in the form of rustic baskets obtrude themselves before Corinthian columns, and the attempt in other ways to combine rustic grace with classic beauty and simplicity is an utter failure. The delicate fence that guards the place from encroachment on the front affords one of the best examples of old wrought-iron work to be found in the country; yet the latest addition to the grounds is a heavy stone wall, built with an affected roughness, showing the broken stone and lines of mortar, and two circular piers that are barbarous compared with the delicate finish of the older stone work. The impression is one of cost and pretension. Vulgarity is stamped upon all that is modern, refinement upon the work of the past, despite the vaunted progress of the century. The two latest additions to the expensive houses are not lacking in pretensions, but those in the line of horticulture are absurd. The fine trees on the road in front of them have been hacked to permit a view of the buildings, and the lives of the elms have been shortened by scars that invite decay. Shrubs, disposed at regular intervals or in straight lines, are clipped with the shears, which gives them round leafy heads and a few sparse flowers.

The owners of both places are ambitious of social advancement, but are unsuccessful in their efforts to attain it. Those who accept their invitations are sometimes ill-bred enough to ridicule their host's pretensions. Both these men are of the "know-it-all" order, and would not consult an architect or landscape gardener; neither would they listen to advice or suggestions from others, and they are surprised that their expenditures do not secure universal admiration for them. Truly may it be said of the Boltonians, "Ye may know them by their works," and if their glory has departed, may other places avoid the evils of their ways and thus escape the consequences thereof.

JOHN DE WOLF.

AN AQUATIC GARDEN.

WE PRESENT a picture on page 321 which prettily represents a novel bit of aquatic and landscape gardening. As no landscape is complete without its vista of water, so all flower gardens need a refreshing variation in babbling brook or flowing fountain. In this case nature had been so chary in her gifts of soil, water and verdure, where we chose to locate in the Mohawk Valley, that the change from sterility to fertility has been all the more interesting. Only a stretch of three or four acres of slate and an inch or so of soil formed the foundation of the work. Grading, digging and quarrying, filling with soil, laying out the grounds planting a few trees, so disposed as not to obstruct the view, was the work of a few years in a quiet, easy way. But the little lake was not the result of an afterthought. The water supply comes from an artesian well half a mile away on the hill, and the water rights to all springs located there were included in the purchase of the property twenty years ago. All the work could not be done at once, and so the construction of the little lake was left to the last, and it is the crowning glory of the whole. The gently sloping lawn leading down to the water's edge, the trees with green and sturdy plumes fitting so gracefully in the curved outline, or with arched and overhanging boughs casting their shadows in the water, form a pretty picture, all the more pleasurable because God did not make the scene, but inspired it.

The miniature lake is 100 feet long by 60 broad at the eastern end, gradually narrowing to 20 feet at the western. An embankment 6 feet high on the north side is required to keep the water at the desired level. In the broadest part, about 20 feet from the eastern end, was built an island about 15 by 20 feet, made of rough masonry below the surface of the water and above of shelving rocks, placed in about the same position they occupy hereabout in nature. This cemented rock-work was covered with rubbish and soil. The shrubbery planted on it serves as a natural shade for hardy cypripediums and other shade-loving plants. A fountain in the center plays during dry weather and keeps the place moist and green at all times. The lake shelves gradually from the edge down to the center, where it is from six to eight feet deep. The bottom is for the most part shale rock, which was covered with a heavy stratum of clay, pounded down; but millions of angle-worms bored inquisitively through this barrier, making it as porous as the nozzle of a watering-pot; but cobblestones and cement proved too much for them, and our lake is now worm and water-proof. Beds are made in the bottom by laying walls of stone and filling the spaces between them with soil ,in which are planted hardy water lilies. On the sides and around the whole circumference indeed, are placed pockets at irregular distances. These are cemented, and some are filled with soil to within a few inches of the surface of the water and others to a level with it, according to the varying needs of water-loving plants. In some of them float islands of water hyacinths, in others flourish stately grasses, bamboos, sagittarias, pretty water poppies, seedlings of tender water lilies with delicate young buds and blooms, irises, and, in fact, everything which likes moisture and stands the sun. Around the island two feet under water is a bed about four feet in width, in which is planted the hardy *Nymphæa alba rosea*, the first to show the ruddy blush which comes with early rising. Also *N. candidissima*, so strong and sturdy in its cramped quarters that it pushes itself in huge upright bunches against the higher wall, hiding its blossoms between its stately leaves. Pontederia refuses to move away, but nelumbium runs about and intrudes itself wherever it gets a chance.

As the season advances and the temperature of the water rises, tender water lilies in tubs are sunk between the beds of hardy lilies, and this completes the planting of the water garden, and when the summer days have come, pink and lavender, red and purple mingle with large white lilies, their leaves overlapping, green and copper and brown, reaching out to one another, commingling tropical splendor and fragrance with the chaste and sturdy beauty of the temperate zone. Did ever the finny tribes disport themselves in smoother water or more refreshing shade, cast by dainty parasols that queens might envy, but never possess; made without hands, yet fringed and fluted and perfumed in Nature's laboratory, and exhaling their fragrance without stint or pay?

SAY'S ROSE.

PLATE I.—*Rosa Sayi*, Schweinitz, Keating in Long's Exped. App. 4, 113 (1825).

Rosa Sayi is one of the most attractive of our native wild roses. Although first described so long ago as 1825, it has not received much attention from botanists, and evidently none from cultivators. In fact, it has commonly been misunderstood, having been referred to other species. In 1885 Sereno Watson recharacterized it,* and separated it from the arctic *R. acicularis*, to which it had been referred.

The species belongs to that section of the genus which is characterized by the sepals being somewhat united and persisting after the petals fall. This section includes about a dozen western and northern species, none of which are well known among cultivators. One of the most conspicuous marks of *Rosa Sayi* is the profusion of weak and straight prickles upon the stems. Two closely allied species possess a similar character, however—*Rosa Engelmanni* and *R. arkansana*. *Rosa Engelmanni* bears an oblong hip or fruit, while the hip of *R. Sayi* is globular, as shown in the plate. From *R. arkansana*, Say's rose is distinguished, among other things, by the broad stipules and obtuse base of the fewer leaflets.

Rosa Sayi was first collected by Long's expedition to the Red River of the North, which was sent out by John C. Calhoun in 1823. It was probably found somewhere to the northwest of Lake Superior. It is now known to occur so far west as Colorado and to extend eastward into Michigan. The writer collected it at several places in the "pine plains" of Michigan in 1888, somewhat below the 45th parallel of latitude. It often grows upon the sterile sand of the plains, forming a neat bush three or four feet high, and bearing, in June, a profusion of delicate, warm and showy flowers. In fact, it is one of the most beautiful of our wild roses, and there is no reason why it should not yield good results under cultivation. The flowers are two to two and a half inches across, very open, and of a fresh and delicate rose color. The foliage and habit are attractive.

Thomas Say, for whom this rose is named, was one of the most noted of the early American naturalists. He gave particular attention to entomology and conchology. It is said that he discovered more new species of insects than any man before him. In 1812, at the age of twenty-five, he founded the Philadelphia Academy of Sciences. In 1818 he was connected with an exploration of the coasts and islands of Georgia and eastern Florida. The next year he joined Long's party to the Rocky mountains, and in 1823 he was naturalist of the expedition to the Red River of the North, when he collected the rose which bears his name. In 1825 he joined Robert Owen in the famous New Harmony settlement in Indiana, where he died in 1834. From 1824–8 he published his *American Entomology* in three volumes, and at New Harmony he published seven volumes of his *American Conchology*, a work which was never completed. Long after his death his works were edited and republished.

L. H. B.

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*Proc. Amer. Acad. Arts and Sci. XX, 340.

STRAWBERRY GROWING IN FLORIDA.

STRAWBERRIES are grown in Florida for home consumption only to a slight degree; they are mostly produced for shipment to the north, hence there is very little scientific interest attaching to the pursuit so far as the discovery of new varieties is concerned, and the development of old varieties to that stage of perfection to which northern growers are stimulated by frequent competitive exhibitors at the fairs. The Florida grower pursues a system of Spartan simplicity; the two questions of paramount importance with him are to grow, first, a berry that will carry well; second, and dependent on the first quality, one that will sell well.

There is practically only one variety in Florida, the Noonan Improved; and that is a berry so inferior for home consumption, that among the many luscious varieties of the north, it would probably not occupy a place higher than the tenth, even if so far advanced as that. It is a berry rather under the medium size, varying in shape from obtusely conical to nearly round, hard, tolerably acid, ripening unevenly in the winter or early spring, when it frequently becomes brilliantly sunburned on one side, with a gloss almost like glass, while the lower is yet white or even green. Towards the end of April and in May, however, it ripens up more evenly, owing to the warmth of the ground and of the atmosphere during the night; and it then becomes a passable berry. But during February and in March and April it is so hard and sour that the market-goers in Florida generally give it the go-by, being well content to let their northern brethren have it. In short, then, the Floridians grow strawberries rather to please their northern customers than to please themselves; and it is a standing marvel to us what an immense appetite the people of the north have for this little, hard, acid berry.

One thing may be urged in explanation; the northern people are generally able to smother it in cream, while the cowless Floridians must be content with the emollient influences of sugar alone; hence the latter demand a sweeter berry than the north.

But the Florida picking season lasts so long that we are able to ship to the north until our pickers are completely tired out and go home, and still have a month or six weeks left in which to pick and enjoy for ourselves after the time for the profitable northern shipment has passed. There are few northern people who comprehend the length of our strawberry season. The writer has picked a pint of berries February 1; begun to ship by the 20th, and continued up to May 5; then picked for wine, for canning, preserves, etc., two or three weeks longer, and finally gathered enough to make a last shortcake on the 4th of July, all from one variety, the Noonan.

This season has been phenomenal. We began to ship in considerable quantities by January 10, and continued up to March, when the two frosts of the 3rd and 17th bisected the season, by cutting off all the bloom and young berries, so that we shall not ship any more to profit before April 10, and shall do well if we can continue to ship up to May 10.

Some of these very early shipments bring fabulous prices. A grower who had acquaintances in Chicago once received an order for a few quarts in January to supply the guests at a "swell" wedding. By carefully gleaning his patch he got a pint at a time. He put the pint in a quart basket, lining it thickly all around with cotton, and sent it by mail. In this way he "shipped" four quarts, and they brought him a check for forty dollars.

The writer once had a few quarts in a bushel contributed by different growers which was sold in Boston and netted \$52.80.

On the other hand, there are often shipments made which go to utter loss or even bring the shippers in debt for freight charges. They are picked too soon after a rain, or there comes a sudden spell of warm weather in the north before they reach the end of their long journey, or a blizzard strikes the northern city, and the berries are totally lost or sell for a song. Early in the season berries can be shipped 1,000 or 1,200 miles with perfect success in ventilated "gift crates" without ice, but by the last of March or April 10, this becomes hazardous and the ice-car comes in demand. At present the refrigerator car service costs nearly twice as much (10 cents a quart, \$3.20 a bushel) as it does to ship them by open express, and this greater cheapness sometimes tempts growers to their sorrow.

This enormous transportation charge is one of the drawbacks of the industry, but the growers hope to be able by an other year to induce the railroads to make a substantial reduction. Nearly, if not quite, half the acreage of the state is in this (Bradford) county, in what is locally known as "flatwoods" soil. This is so level that in the midsummer rainy season, acres of the surface in the piney woods will be covered with sheets of water an inch or two in depth; and this soil carries so much humus or vegetable matter as to make it very retentive of moisture and render necessary a thorough system of surface drainage.

The land is thrown up into beds from eight to twenty feet wide, containing each from four to ten rows. The plants are always set singly and kept so. The sun in winter is so low and slanting that each plant must be isolated and have a good exposure, or else the fruit will be "off color."

After the bedding is done the work of cultivation and fertilizing is performed with hand plows by man power; this is found cheaper for the small patches, which generally prevail, than it is to keep a horse on northern grain and hay.

Commercial fertilizers are almost exclusively employed; cut-worms and crab-grass so abound in Florida that it is found necessary to use every resort to avoid giving them encouragement. Besides that, saline manures and bone dust are found to give firmer, sweeter fruit, with better shipping qualities, than animal manure produces. Cotton seed meal and nitrate of soda are used to force late and backward plants, but these must be employed with caution. Early in the growth of the plant they are good to produce foliage, to give it body; but later in the season they are apt to roast the roots and produce soft berries; at this stage mineral manures are preferred to give the berries firmness.

The best growers frequently apply 1¾ or 2 tons per acre, costing from $60 or $70. Where the general management is correspondingly good, it is found that the last half ton gives a greater profit than the first ton, or all the rest put together.

To take an acre of raw pine woods, clear, stump, break, ditch and plant it, will cost $125 to $140. The mulching and cultivation will bring the expense up to $175 or $200 per acre before a berry is picked.

A hundred bushels an acre up to the end of the shipping season is a fairly good yield, but frequently 35 or 40 bushels more might be gathered up to the end of May. The writer has shipped 332 bushels, up to May 5, from a patch of about 2¾ acres. The first year the writer netted $6.21 a bushel; the second year, $7.21; the third year, about $5. $5 a bushel the season through is a very fair return.

The best growers get from $350 to $700 an acre, or say $200 to $550 an acre clear of all expenses whatever. Many of the less thrifty ones barely make a living; they pledge the crop in advance, like the old cotton planters, to procure a supply of fertilizers and the necessaries of life. Thrift counts here, to profit, just as it does in the north.

Florida. STEPHEN POWERS.

PROFIT IN NORTHERN STRAWBERRIES.

THE TESTIMONY OF ONE WHO MAKES IT.

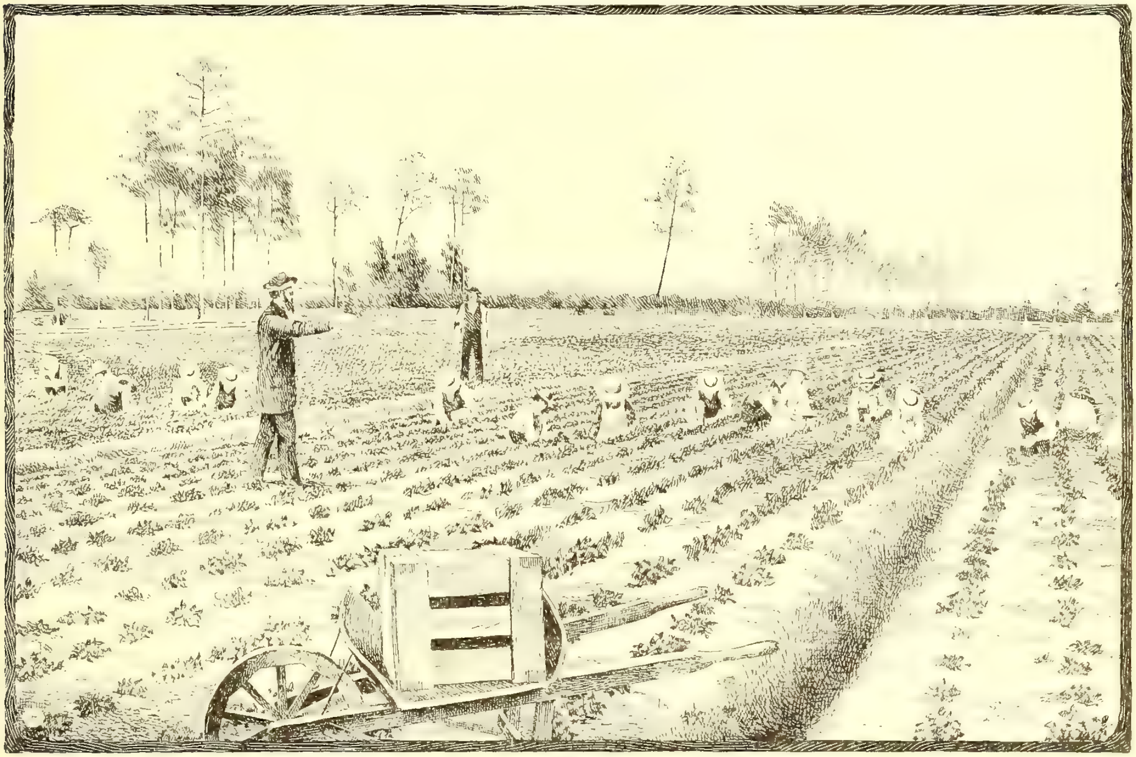
There is great difference of opinion as to the best mode of cultivation of the strawberry, probably owing to diversity of soil and locality. The following method, according to my experience, is to be commended. In selecting ground, choose that which is as free from weeds and stones as possible, as the presence of either will double the labor. It would be advisable to thoroughly cultivate the soil upon which berries are to be set for two or three years before planting, and allow as few weeds as possible to go to seed. Fine berries and large crops have been raised on green sward, but the main objection is that the crop is liable to be destroyed by the ravages of the white grub. I believe a yellow loam to be best adapted to the berry, as it produces fruit that is large, firm and of good flavor. Muck land will produce fine crops, but less firm and of inferior flavor. A gravelly soil will produce good fruit in a wet season, but in a dry season they are a failure.

The varieties of berries that have been raised to the greatest extent in this section are the Wilson, Crescent and Burt. In the opinion of some, the Wilson has had its day; and it is a fact that we cannot get such a growth of vines as we did a few years ago. But we have always obtained the largest yield from the Wilson up to the present time. Last year I obtained an excellent yield from the Burt, of which I raised only about one-tenth of an acre. On one bed of an acre we raised 250 thirty-six quart crates which were nearly all Wilsons. Another bed of one-half acre, Wilson and Crescent mixed, raised 84 crates.

Berries are generally set in this locality about the 1st of May. It is advisable to set them as soon as the ground is fit. In taking up plants for setting, the best are obtained by taking up the row clean, as the plants in the center of the rows have larger roots than those growing on the outer edge, the latter being the last settings of the summer. In selecting the plants, it is economy to choose only those that have a thrifty root. Remove all old runners and all leaves except about three, being careful not to disturb the crown. Should the plants be far enough advanced to show flower-buds, remove the buds; or remove them when they do appear, as, by bearing, the plant will be deprived of strength which is needed for its growth.

We set in rows about four feet apart and plants one foot apart. The method of setting is by line, using a common bricklayer's trowel. Some men in our vicinity have set as many as 8,000 plants in a day, but from 4,000 to 6,000 is considered a good day's work. In a week or ten days after the plants are set they should be cultivated and hoed, and then given an application of commercial fertilizer of from two to three hundred pounds per acre, scattered around the plants. It is generally conceded that commercial fertilizer is better than manure for growing berries, as the ground is kept more free from weeds; and, having made the test, I find that I can raise larger crops with less expense by its use. Berries generally need five hoeings during the season. If the first application of fertilizer seems insufficient, after the first or second hoeing give another application. I have usually found it necessary to do so, as I use nothing else.

Many fine growths of vines are raised in this way only to be destroyed from lack of protection during the severe winter. I have found straw to be the best covering. It should be removed in the spring as soon as the frost is out of the ground and another application of about 800 pounds of fertilizer per acre given, sown on the rows, being careful not to apply it when the vines are wet as some kinds will burn the plant. The crop will be ready for marketing about the 20th of June. One great trouble with strawberry growing is that people expect too much from too little labor and expense.



A Florida Strawberry Plantation: from a Photograph.

I raised last year from an acre and a half 334 crates, which sold for $1,033.28 in Oswego, which is about 8¾ cents per quart. The expense for raising said crop was: for plants, $12.00; for taking up, trimming and setting plants, $15.00; for hoeing, $40.00; for 1,800 pounds fertilizer, $31.50; for straw and putting it on, $25.00; for picking, $240.48; for overseeing pickers, carrying and crating, $35.00;

for drawing berries to market, $25.00; use and loss of crates and baskets, $45.00; total expenses, $468.98, leaving a profit of $564.30. This is, of course, above the average yield and price. By referring to accounts which I have kept for the last six years, I find that my average yield during that period has been about 180 crates per acre and the average price 7¾ cents per quart, which, according to the above schedule of expenses, would leave a net profit of $189.55 per acre.

The above expenses include 2 cents per quart for picking. In some localities the price is but 1½ cents per quart, which would leave a greater profit. Ten or twelve good pickers will handle an acre of berries, and good pickers are very essential to a berry-grower's reputation. The swiftest picker is not always the most profitable, but rather the one who does his work well. In harvesting a large crop it is impossible to see that every box is picked as it should be, but it is very important that the grower gives particular attention to this part of the work and sees that it is done well. It seems the height of inconsistency for a man to put up a package of fruit which looks very well on the top while the baskets in the bottom of the crate contain berries of a most inferior quality, and send it to market with his name in full printed upon it. C. A. STONE.

Oswego County, N. Y.

STRAWBERRIES IN CENTRAL NEW YORK.

A PRACTICAL EXPERIENCE.

Eight years ago I came into possession of four acres of land on which I am growing fruits and vegetables. Three acres are of a deep clay loam, underlaid at a depth of three feet with solid rock, no part entirely level, drainage perfect. With the exception of 100 bushels of poultry droppings, no farm manures were used the first four years. I set my small fruits the second year, and added market gardening crops the fourth. As I used the same methods and manures in bringing all this land into condition for fruit growing, I need only tell the story of my first strawberry crop. On the 15th of June one-half acre of land densely matted with quack grass roots was selected, the grass mowed to the ground and the land ploughed nine inches deep. I found that quack grass roots did not grow deeper than six inches; three inches of fine soil answered my purpose. I wanted a good seed bed. One hundred bushels of wood ashes and 200 lbs. of ground bone were worked into the soil. One bushel of buckwheat was sown June 20th; this was ploughed down the latter part of August. 50 bushels of wood ashes and 200 lbs. of the Buffalo Fertilizer were sown broadcast and well dragged in. One bushel of rye was sown on the buried buckwheat. The rye, when 15 inches high and very thick, was ploughed down the 10th of the following May. 100 bushels of poultry droppings were finely broken and evenly sown, as were 100 lbs. bone black.

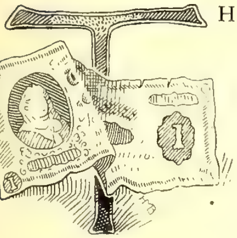
Four thousand strawberry plants of the following varieties were set in rows 3½ feet apart on the half acre, Bidwell, Manchester, Miners' and Sharpless. Plants were freshly dug and not a single plant failed to start. I began to cultivate and hoe promptly, for I believe that every square foot contained 100 young buckwheat plants. Plants were trained on the narrow row system. By fall the bed presented a sight well calculated to delight the eye of a lover of the strawberry. After the first hard freeze I covered the plants with two tons of oats straw, two years old. This is none too much in this part of central New York, where the mercury frequently goes as low as 35° below zero. A part of this straw was removed as soon as freezing nights were over in the spring. My first crop was 2,000 quarts, which I sold at strictly fancy prices. This was the only bed that I ever picked two years. It does not pay to keep a bed of strawberries here more than one year, and besides the quack grass was not all rooted out as I found to my cost the next year. I now turn the bed under just as soon as picked, and sow with buckwheat, which is in turn ploughed down and dressed with wood ashes, and sown with rye about Sept. 10th of each year. The rye is turned under as soon as I can do so without injury to the soil the May following. Superphosphate of lime at the rate of a half ton to the acre is sown as soon as the ground drags up perfectly fine. Land is now ready for my market gardening crops. Except for peas, nitrate of soda is sown at the time of setting all plants, and on all seed crops a light dressing is given as the plants need it. Stable manure is used now for blackberries raspberries and the larger fruits.

WM. MILLER.

[Our friend gives the reader the impression that his heavy mulch is placed on strawberries solely to prevent injury from cold. It will be understood by the intelligent reader that the alternate freezing and thawing works more mischief than freezing only.—ED. AM. G.]

PEARS FOR PROFIT.

NOTES FROM A SUCCESSFUL HUDSON RIVER GROWER BEFORE THE OSWEGO HORTICULTURAL INSTITUTE.



THE PEAR is still essentially a luxury, and all luxuries are profitable to grow when one knows how to handle them. Pear culture, in common with all fruit culture, is increasing, yet the conditions for successful pear growing are so local that there is little danger that the business will ever be overdone.

A high site is essential to successful pear culture. Better drainage is thereby secured, trees ripen their wood earlier in the fall and are therefore hardier than on low soils, trees are usually longer lived, and fungous troubles are commonly less. The ideal soil is a strong clay loam with a gravelly loam sub-soil, but any strong loam is good. Dwarfs usually demand heavier soils than standards.

Heavy fertilizing is imperative. The ideal fertilizing is that which induces a good growth, but which causes the wood to ripen early. Stable manures in large quantities induce a late growth if applied in the spring. It is therefore essential that it be applied in the fall, in order that its soluble ingredients may become incorporated with the soil and be ready for use as soon as the tree starts in the spring. I obtain best results by using both stable and commercial fertilizers. In concentrated manures, I use chiefly unleached wood ashes and prepared bone. Fertilizers rich in potash are necessary. Kainit and muriate of potash are also excellent.

Pear orchards must have good culture if they are to yield well. I give my orchards clean culture throughout their existence. I would never put a pear orchard into grass. I never cultivate after the middle of July or first of August. At the last cultivation it is a good plan to sow rye, which is turned under the next spring. Dwarf pears demand exceedingly light culture.

Young trees—yearlings or two-year-olds—are best for setting. It is a good plan to buy the trees a year before they are to be set into the orchard. These should be set in nursery rows, where they can be cultivated frequently, and when planting time comes the thrifty and symmetrical trees should be selected for the orchard. In this manner uniform orchards can be secured. If the trees are purchased when a year old, it may also be the cheapest plan. When the trees are placed in the orchard, all side branches should be removed or cut back to one or two buds, and all vigorous leaders should be headed back.

I should advise that all standards, except Seckel, should be set 25 feet apart each way. Seckels may be set as close as 20 feet. I think that 20 feet each way is none too much for dwarfs, when they are trained in the pyramidal form.

Pears demand little severe pruning. During the first four or five years the shape of the top should be determined. The general policy is to make the trees spread and to keep the center open, in order to throw the bearing wood well to the outside of the top. Subsequent pruning consists in an annual light thinning out of the top. Dwarfs require special treatment. The upright growth should be cut back about two-thirds each year, and the trees therefore never become tall. The lateral growth should be encouraged. This treatment results in a pyramidal or umbrella-shaped top.

It cannot be stated unreservedly which are the better, standards or dwarfs. It is a matter of men and conditions. Upon the right soil, and particularly with the right man to handle them, dwarfs are profitable; but most people will succeed better with standards. Dwarfs should be set deep and the heads should be kept very low. The head of a standard should start at four or five feet.

I spray my pear orchards with paris green, the same as I do my apples and plums. I should not think of growing pears without spraying. I not only destroy the codlin moth, but the slug and other insects.

The fruit must be thinned, if the best results are sought. I cut the fruits off with shears when they are the size of cherries. I have found that boys do this work better than men, because they are not afraid of removing too many fruits. The work must be thoroughly done. The increased size of the remaining fruit will usually make a larger bulk than the whole of a heavy crop would have made, and it will bring a much better price.

The fruit must be handled carefully from the time it is gathered until it reaches the consumer's hands. Pears are ready to pick as soon as the stem parts readily from the spur when the fruit is raised up by the hand. The fruit should always be picked by raising it up in this manner, never by pulling it off. The entire stem should always be left on. If you are growing pears for a fine market, as I am doing, the fruits should be ripened under cover. Pick them when the stem parts, as described above, and pile them in a dry room and cover with woolen blankets. A very high and rich color and the very highest flavors will be secured in this manner. As soon as the color becomes pronounced, place them upon the market. The length of this period of ripening varies with the variety and season. It runs from ten days to three weeks.

Fine fruit should be marketed in small packages, for it then ships better and is more attractive. I use a bushel box, or choice sorts are sometimes put up in smaller packages. Kegs and baskets are unsatisfactory for the finer pears, as the fruit is apt to become chafed. I have exported pears to a large extent, and I find a good and growing foreign market. Even in France the demand for American pears is considerable. Of the medium-sized or small pears, as Clairgeau and Lawrence, I place four dozen in a box for exportation, and of the larger kinds three dozen. The fruits are wrapped in paper and packed in two layers, separated by excelsior.

I grow the finest flavored pears I can secure, and they pay me far better than the showy but poorer fruits. More care is required in finding a suitable market for these excellent sorts, but the extra effort pays. My choice for standards is as follows: Tyson, Clapp, Bartlett, Seckel, Shelden, Anjou, Bosc, Clairgeau and Lawrence. For dwarfs I have had best success with Bartlett (preferably double-worked), Anjou, and Duchess. For export, I grow Anjou, Bosc, Clairgeau and Lawrence. One or two of these varieties are not of the highest quality, but they are particularly desirable in other respects. The Seckel grows slowly, making short-jointed wood, and it requires special treatment to be made a success. It must have a great abundance of fertilizing, and the culture must be the very best. Upon an acre of Seckels, where the ground was already rich, I last year applied 25 loads of good stable manure, one-half ton of commercial fertilizer and one-half ton of wood ashes. Although a poor season, my crop of Seckels was superb. This extra care and feed is necessary in order to get fruit of good size, and with a fair, clean and tender skin. The Bosc is a poor grower in the nursery, and it is difficult to get a good tree of it. I remedy this defect by top-working on the Kieffer. The Clairgeau demands a high and dry soil, for on low and moist soils it is likely to lose its leaves prematurely. I do not grow the Kieffer for the reason that its fruit is only fit for canning. There are other pears, as the Bartlett, Anjou and Bosc, which are equally good for canning, and which are also valuable in many other ways.

The profits of pear culture depend almost entirely upon the man. Probably most of the orchards throughout the country do not pay a profit per acre of more than $50 or $75. My own orchards, however, net me from $500 to $600 per acre, one year with another. GEORGE T. POWELL.

BANANAS FOR THE TABLE.

This is the season when Cuba and other West Indian points embellish the markets with choice bananas. The fruit from those plantations is much richer in flesh and color than the ordinary straw-ripened bunches from Aspinwall. With their sun-mellowed flavor and tropically gilded and reddened rinds, they are decidedly more attractive than the common thin plantation style of the usual steamer lots. Without interfering with the dessert list, northerners are learning to prepare bananas for tea and breakfast relishes. It is remarkable that such a fragile fruit will undergo the ordinary operation of freezing and retain its delicacy. An easy West Indian method of cooking either bananas or plantains,* though the former should be exceptionally firm if used, is to slice them lengthwise about one-third of an inch thick, melt a piece of butter, of walnut size, for each banana, and fairly brown quickly.

When the fruit is rather fully ripe, it can be managed by dipping it in egg and flour. This, of course, requires slightly more fat. A showy tea-dish can be formed by cutting into discs and covering same with finely grated cocoanut and a suspicion of nutmeg. Another plan likely to become popular is to serve similar slices of bananas in heavy home-made strawberry syrup. This wedding of flavors is truly delicious.

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* In this sense practically a distinction without a difference, though meant to signify the true *Musa sapientum* as differing from *M. sumatrana*, known as a cultivated plantain in the West Indies.—ED.

THE JAPANESE ORANGES.

It begins to look as if Japan, having sent to America the great flame-colored kaki, or oriental persimmon, a beautiful group of plums, the loquat, and many other fruits of value, was about to add, in a number of citrus fruits, the most important acquisition of recent years. Why this is so, I shall endeavor to show in the course of this brief article.

The Japanese Agricultural Society describes and figures some thirty varieties of oranges and other citrus fruits, besides the wild stock (*Citrus trifoliata*), which is used to dwarf the standard varieties. Many of these varieties are of little commercial value, but others promise to be more hardy, and hence adapted to a larger portion of the United States than are any other class of citrus fruits. Further, the possibilities of dwarfed orange trees for culture in plant houses and conservatories may greatly develop. Lastly, the unique "cumquot" orange (*Citrus Japonica*), offers a new field for scientific horticulture, as it may prove the progenitor of a new class of fruits, and even in its present type form possesses much value.

I have lately sent to Mr. Shosuki Sato, of the Sapporo Agricultural College, Japan, for additional information upon the best oranges grown there, methods of culture and illustrations, which will, I hope, throw more light upon the subject. At present, aside from my own experience in the importation and culture of some Japanese orange trees a few years ago, I have chiefly depended upon the observations of Mrs. H. H. Berger, made during two visits to Japan, and a pamphlet of Mr. B. M. Lelong, Secretary of the State Board of Horticulture, upon citrus culture in California. Mr. H. E. Amoore has also been in Japan, and his reports agree in the main with my other sources of information. I have, of course, followed my own estimate of the value of such varieties as I have seen in fruit.

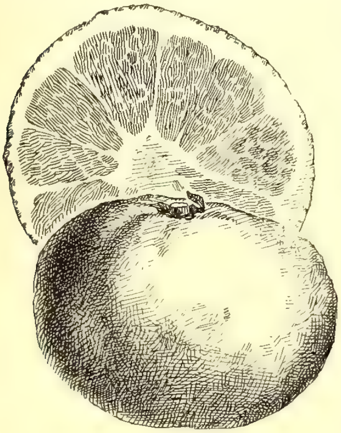


FIG. 1. OONSHIU.

Broadly speaking, the Japanese citrus fruits consist of small, highly-flavored, sweet oranges of the Mandarin or "kid-glove" class; large, light-colored oranges and many sorts of sour oranges, much liked by the Japanese; a class of oranges of curious and remarkable shapes or colors, the result of the same gardening taste that dwarfs pines and oaks; and lastly the famous round or oval "cumquots," or "kincquats," which are oranges not larger than a cherry or English gooseberry, growing on small bushes. The wild *Citrus trifoliata*, to which I have alluded, is deciduous. Otherwise it appears like an ordinary orange, except that its large leaves are trifoliate, and its thorny defenses are far superior to any other tree of the citrus family. The fruit is about an inch through, light yellow in color and nearly filled with seeds. It is an exceedingly ornamental shrub, and is much hardier than the common orange.

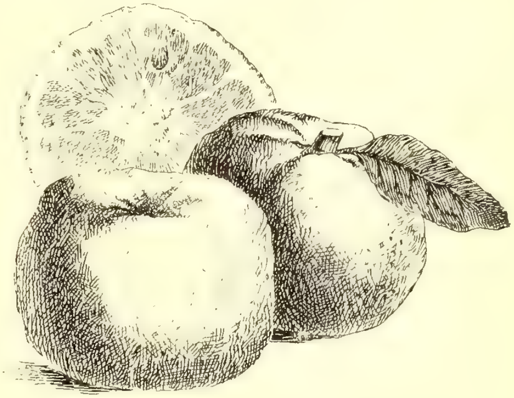


FIG. 2. KAWACHI.

Of the Mandarin class, one of the leading sorts is the Satsuma or Oonshiu. The fruit is about three inches in diameter, flattened, rind very soft and easily taken off, fine texture, smooth, flesh very sweet, and nearly or quite seedless. Ripens about the middle of November and keeps well. The tree naturally grows in a bushy form, the favorite plan in Japan being to grow them like a low-headed quince, so that all the fruit can be gathered from the ground. This variety was first imported years ago, on dwarf stocks, by my father, James Shinn. After eight or ten years' experience with dwarf trees in sixteen-inch tubs, where they blossomed and bore good crops, we planted most of them in the open ground, and also grafted some in the tops of large

Los Angeles seedling trees. They all throve, and bear heavy crops every year. Trees of this variety are said to endure cold of sixteen degrees Fahr. without injury, and the Japanese certainly grow them in districts where the ordinary orange cannot be made to succeed.

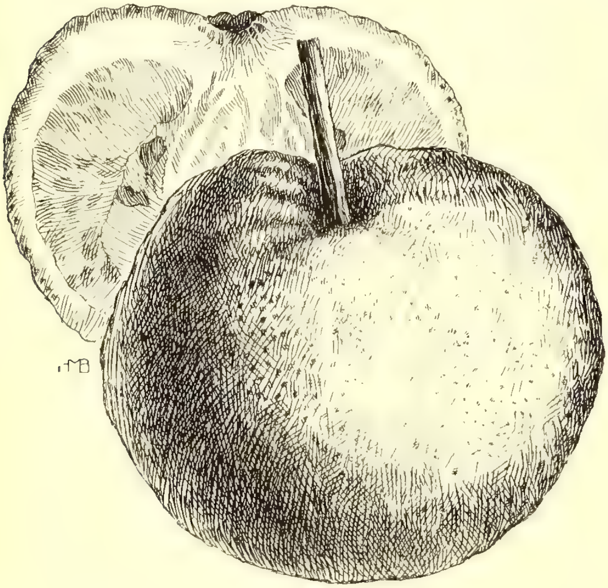
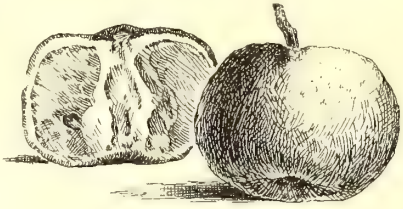


Fig. 3. Natsu-dai-dai.

Mr. Lelong considers the small, high-colored Japanese orange grown at San Gabriel by the Chapmans one of the best varieties known in California. The orange box in which this sort is shipped is twelve by five by sixteen inches, and holds from one hundred and twenty-five to one hundred and fifty oranges. This is probably the Kawachi, an excellent variety of the Mandarin type. It makes a larger tree than the Oonshiu.

Most of the leading varieties, as described by the Japanese Agricultural Society, have been introduced into California, but the labels of early importations were badly mixed, and it will be some time before the matter can be straightened out. The following are worth mention:



Fig· 4. Sakura-jima.

Kino-kuni, fruit two and a half inches in diameter, orange yellow, sweet.

Koji, fine tree for dwarfing and pots. The bud and flower "are used as spice in Japan," and the pale yellow fruit is of fair quality.

Dai-dai, a bitter orange, used for preserves and marmalade. The fruit will remain on the tree for several years. A hardy, large tree, much used for avenues.

Natsu-dai-dai, the curious "summer orange," a very large, bright fruit, which is not eaten until the second summer, when it is fit for the table. Resembles a pomelo.

Kunembo, deep orange rind and very fragrant; sweet pulp. Mandarin class.

Yamabuki, large, pale-colored, greenish, conical-shaped fruit; coarse, sub-acid, a long keeper.

Sakura-jima, coarse in quality, small, roundish oblate, dwarf growth.

Shiriwa-koji, thin yellow rind, sweet solid pulp, good quality.

Beni-koji, very red and thin rind, sub-acid pulp, slightly bitter.

Iuko, a hardy tree. Fruit yellow, thick rind, sweet when ripe.

Toko-Iudzo, small, round, pale yellow rough-skinned fruit. Tree a very heavy bearer.

Yagatara, very large fruit, thick rind, sub-acid, juicy. A pomelo with white flesh.

Maru-bushiukan, large citron-like fruit, almost all rind; used in confectionery.

Bushiukan, large, solid fruit, with little pulp, and that bitter. Fruit terminates in five large fringe-like lobes. Used for perfumery and for ornamental pot-culture.

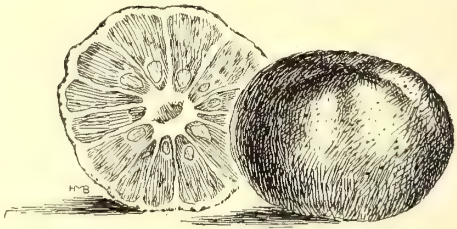


Fig. 5. Shirawa-koji.

Among the other varieties are those with the names Kinugawa, To, To-dai-dai, Beni, Naruto, Kabusu and Ama-dai-dai, curiosities of the citrus family, most of them, and usually dismissed with the remark: "not desirable." The best eating oranges which have yet come from Japan are the Oonshiu, the Kawachi and the Kino-kuni. These are in all respects first-class, and fill a new place in American horticulture.

The Oonshiu has been decided by Professor Van Deman to be identical with the Satsuma, and is grown as such in Florida. Mr. Amoore tells me that this variety is cultivated almost exclusively in the province of Kishiu, and is known as Unshiu (pronounced Oonshiu) there and in Satsuma. Trees came to us in California eighteen years ago, under the name Unshiu, which thus seems to have prior claims.

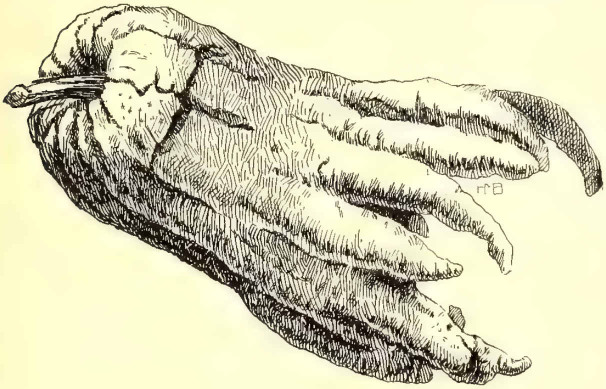


FIG. 6. BUSHIUKAN.

An interesting article from Professor C. C. Georgeson, of the Tokio Agricultural College, was published in 1888, in which he said: "Japanese oranges are in many respects different from those grown in the United States. Most of the Japanese varieties belong in fact to an entirely different species, the *Citrus nobilis* of botanists, otherwise known as the Mandarin orange, while the American and European oranges belong to *C. aurantium*. The Mandarin type is well represented in the Oonshiu orange. It is the queen of oranges in Japan, and needs only to be known to be appreciated in America. It may be described as follows: Fruit medium to large, oblate and flat, or even slightly depressed at apex and base, and at the latter place having a few broad, shallow folds. Rind very thin, separating easily from the pulp, smooth with some lustre, and orange or reddish orange in color. The pulp is divided into eleven or twelve sections or lobes which separate easily from each other. Each section is enclosed in a thin membrane, which does not adhere to the pulp except on the outer or spherical side. The pulp is very juicy, seedless, sweet, but with the faintest trace of acid when fully ripe, delicious, all dissolving on the tongue, leaving little or no fibrous residue."

The claim of hardiness for the Japanese oranges is well sustained. I have seen letters from persons in Louisiana, Mississippi, Florida, Georgia and California alluding to this as the most valuable point in this class of oranges. One man says: "Frost and ice every night for a week. Two Navel orange trees packed and in the railroad depot building were frozen, but the Japanese orange trees in the open ground were uninjured." A Florida grower says that they stand eighteen degrees of frost without shedding the leaves. J. W. Moore, of Jacksonville, Florida, wrote, in 1885, that buds stood when large sour stocks were killed down. At Soquel, Japanese oranges stood fifteen and a half degrees without injury, and at Kelseyville the thermometer fell to twelve degrees without hurting them. The claim has been made that they will stand from twenty to twenty-four degrees of frost, but this remains to be proved.

Leaving the Japanese oranges of the *Citrus nobilis* species, I turn to the two varieties of the interesting *Citrus Japonica*, the cumquots, or "kincquats," which deserve especial mention. There are two sorts, the Marumi-kinkan and the Nagami-kinkan. The first has a deep yellow fruit from three-quarters to an inch in diameter. The second has an oblong and somewhat larger fruit. Both grow on bushes of from six to twelve feet high. The whole fruit, rind and all, is eaten, and people become very fond of them. Preserved in sugar, or crystallized, the cumquot, wherever known, is exceedingly popular. The bushes in fruit and blossom are very handsome, and can be recommended for pot-culture. The Japanese graft cumquots and large oranges together on the same stalk, in the many attractive and curious combinations so dear to these ingenious gardeners.

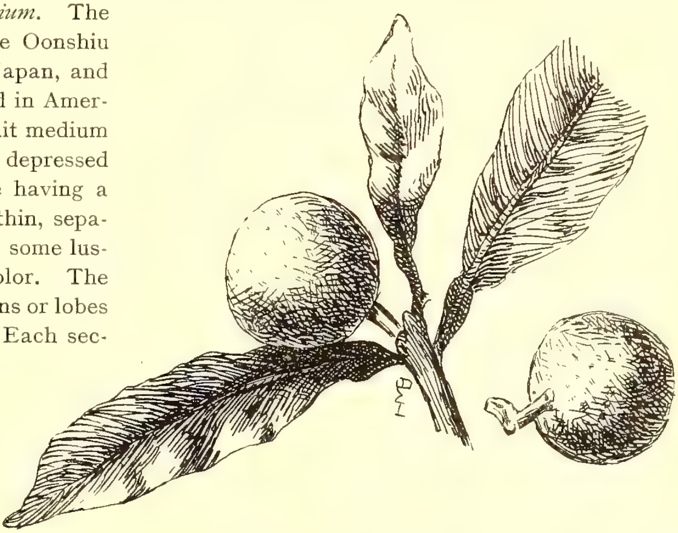


FIG. 7. MARUMI-KINKAN.

I have already published several articles on the dwarfing of Japanese oranges, and the possibility that American horticulture can develop a new industry—that of pot-grown orange trees in full bearing, to be sold in that shape to the wealthy classes of such cities as Chicago and New York. The suggestion that a hardy, dwarfed Oonshiu (grafted on *Citrus trifoliata* stock) might serve admirably as a window plant, brought me eager letters from all parts of the country, showing how many persons would like to experiment with pot-grown oranges. I have not, of course, trees for sale, but I wrote to all of my correspondents who enclosed a stamp, giving them all the information obtainable here. The fact is, however, that dwarf pot-grown trees from Japan ought to be shipped to California, New York, or some other center, and there receive skilled care for a year or two before they are in condition to be offered to the public with any assurance of safety. Moreover, if well grown potted oranges are desired from Japan, careful arrangements must be made there. The Japanese nurserymen "grow to order" far more than we do, and it is often a matter of three or four years of hard work and correspondence for a California nurseryman to get his Japanese connection to send him anywhere near what he wants. But I see no reason why a man who has a camellia house in New York should not, if he chooses, manage to secure well-grown Japanese dwarfed orange trees and establish his orangery. What improvements are possible, especially for the cumquot class, must be left for the future to determine; the outlook is surely bright enough to tempt cultivators.

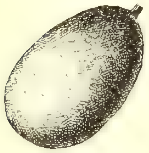


FIG. 8. NAGAMI-KINKAN.

California. CHARLES HOWARD SHINN.

GRAPE NOTES.

FROM THE TESTING STATION FOR MIDDLESEX COUNTY, CONNECTICUT.

GRAPES had a peculiarly unfavorable year in 1889, mildew and rot making unusual ravages in our vineyards. During no year in the last decade has the season been so unpropitious.

Among the most successful of our varieties in 1889 were the Concord, Worden and Ives, notably the latter. This withstood all the untoward influences best of all the vine is strong and healthy, the clusters nearly perfect, and when fully ripe it is fairly good, though inferior to the Concord and much inferior to the Worden as a table grape.

The Concord is still to be regarded as the standard vineyard grape on account of its good cluster, its good shipping qualities, and its demand in market; but for home use or a near market the Worden is better.

The Cambridge is another grape so nearly like the Concord, its parent, as not to be worth carrying as a distinct variety.

The Cottage another Concord seedling, is a good one, a little earlier than Concord, and much sweeter, but not having as good clusters and on the whole not to be largely planted.

The Hartford is a prolific grape of fair quality, but drops too easily from the cluster for a shipping grape.

Moore's Early seems to be the best early black grape for shipping, so far.

The Herbert, Rogers' No. 44, for home use, ripening with the Worden, is large, beautiful and excellent; in our opinion one of the best, if not *the best* of all Rogers' grapes.

The Aminia, Rogers' No. 39, is another early grape deserving a place among desirable grapes.

The Barry, No. 43, is another excellent grape.

The Brighton easily ranks first among red grapes. It wants better care and culture than Concord, and where it is fully at home is far better than the Concord. It is early and delicious; but should be used while of an amber color: when the color deepens toward a purple it deteriorates rapidly in quality.

The Delaware is a most excellent grape, but needs double the enrichment, care and culture of the Concord; clusters should only be grown on long new arms to secure a superior crop.

The Lindley grape is very fine in quality, but not profitable in the vineyard.

The Agawam and Salem, Rogers' Nos. 15 and 53, are in the same category—neither one profitable in a vineyard.

The Diana is a superior grape under favorable circumstances; it needs a warm, deep but not too rich soil, and a southern exposure. The south side of a building is best. The bunches are compact; berries of moderate size, with a peculiar musky flavor, and one of the very best keepers.

For a deep strong border and the south side of a building, the Catawba is one of the finest red grapes. The fruit should be grown on young, strong arms not more than 20 to 25 lbs. to the vine, and packed like the Diana for winter use.

The same may be said of the Isabella, which is our favorite grape for the table; but it needs the shelter of a building or wall.

The Iona is a most delicious grape, but has so much foreign blood in it as to be absolutely unreliable. This came from Dr. Grant as a native grape. A grape nearly or quite identical with the Iona was sent years ago from Austria, by an American gentleman, to the late David Clark, of Hartford, and to Dr. Grant, of Iowa. If not identical with the Iona, the Iona may have been a seedling from it. But whatever its origin, in New England it is a failure.

The Jefferson as a vineyard grape with us is an emphatic failure.

The same may be said of the Prentiss and Empire State.

Of the Vergennes we planted an entire row, some 33 vines, believing it would be a success ; but it has been a disappointment. It is a most excellent keeper, but winter-kills in our vineyard and is quite subject to mildew. Should not be planted in open vineyard but have shelter.

The Bacchus as a wine grape is desirable. It is much like the Clinton, but we think better.

Wyoming Red we think has merit as an early red grape, but we have not yet so fully tested it as to speak with full confidence.

Of Woodruff Red we can only say it promises well.

The Pearl, Othello, El Dorado, Quassiac, Secretary, Excelsior, Ariadne, Waverly, Rebecca, Montgomery, Missouri Reisling, Canada, Autuchon, Arnolds' No. 2 and No. 8, Black Pearl, Black Hawk, Black Eagle, Beauty, can all be left out to the advantage of the practical vineyardist.

The Pocklington, Martha, Lady and Hayes succeed in our vineyard. So does the Niagara, though not as hardy as the Pocklington.

The Green Mountain promises well, is very early; the best early grape we have yet tasted, but needs testing further to ascertain its general adaptability to vineyard planting. If it succeeds as a vineyard grape, it will be a great boon. It is certainly worthy of careful trial in widely varied locations throughout the country.

Middlefield, Ct. P. M. AUGUR

GRAPE INSTRUCTIONS FOR INDIANA.

Prepare the ground by deep and thorough culture. Deep planting is less liable to result in winter-killing than shallow planting. For garden culture, 4x6 feet, 4x8 feet or 6x8 feet are all good distances, if vines are thoroughly pruned and not allowed to bear too much wood or fruit. For field culture, 8x8 feet, 8x10 feet or even 10x10 feet are not too great distances, as each vine can be allowed to bear more clusters. A warm, sunny exposure to the south and east is best, I think. Rich gravelly or sandy loam is undoubtedly the best kind of soil; but any soil that will raise corn will raise grapes. Grapes need to be as well cultivated as corn, to raise as good a crop.

Well-rooted one-year vines are the best. Be sure to trim off all broken or bruised roots. Trim the top to two buds the first year, and the same number the second year. If more start, rub or cut off all but the two best.

Until expected to bear, no staking or tying is necessary, more than to keep them from being worn and broken by the wind. I use posts 6 feet high, with five or six wires, the lower one 12 inches from the ground, the upper one on top the post, and the others at equal distant apart. In the fall, after frost has killed all the leaves, after the second summer's growth, trim to six to eight buds on each vine. Lay down and cover lightly with earth just before the ground freezes. In the spring, just as soon as the ground is done freezing, uncover, and let the vines lie until all the buds have started an inch or two; then fasten well to the lower wire, and as fast as the vines reach a wire, tie to it.

Allow the young bearing vines to grow to the top of the posts; then cut off, and keep them cut off the rest of the summer. Always try to have two strong vines grow out from the crown each summer. In the fall, cut away all the old wood, trim as before, lay down this new wood and cover with dirt. If you should not be able to get new, stout vines from the crown, then cut the old wood back to one bud on each upright and lay down, and cover the old vine. The old canes will answer for three or four years, but will not look so neat or bear as nice fruit as younger ones. About 40 rose bushes planted to the acre will entice the bugs, where they can be caught, and the grapes will be saved. Never allow more than 20 or 30 of the largest clusters to each vine if the vines are no more than 8x8 feet or 8x10 feet, for that gives all a vine should bear. 10 to 15 pounds to the vine would be 3½ to 5 tons per acre.

Give clean culture up to the middle of August, and later, unless the ground is mellow. The ground should never be allowed to become baked. Good soil and cultivation will go a long way toward preventing mildew, rot and other diseases of the vine. Barn-yard manure, ashes or potash and bone dust I regard as the best fertilizers, while lime, plaster and salt are useful. If the soil is very rich, larger and fairer grapes will result, but they will be poorer in flavor.

I prevent rot by spraying with weak salt water twice a week in the evening near sundown. If ice is kept in in the water, all the better; in fact, ice-water alone has proved sure with me. Vines sprayed with cold well water all perfected their fruit, while vines left to themselves, close by, nearly all rotted. This fact should attract the attention of the experimenters.

Bristol, Indiana. L. H. G

TARRYTOWN LETTERS—VIII.

A FRAUD IN TROWELS—A MODEL GARDEN LINE AND REEL—IDEAS ON WEEDERS ARE PRECIOUS—A HOE INVESTIGATION—MORE ABOUT GRASS.

BY A. B. TARRYER.

OUR young people get in the way of using certain garden tools and conveniences while they are with us which they don't easily find in market when they go away, and this state of trade makes the motherly heart of Mrs. Tarryer a great deal of trouble and correspondence. The garden trowel, for instance, as administered is a perfect fraud. It proves that the devil is in the garden. The truth is that the regular mason's trowel, in its different sizes—for pointing, etc.—is the handiest and cheapest trowel for all garden purposes, and I trust this sentiment will go into the next issue of general orders by the Masonic Fraternity. A moulder's trowel, also, is a beautiful implement—highly polished and of exquisite temper—for a lady's hand. Now, when an iron manufacturer dies, or gets on his death-bed, and has given away several hundred thousands, won by cheating Yankee notions, to build churches, his last thought seems to be of some good-for-nothing lot of iron, and he says, "*Make that into garden trowels!*" Only so can we account for the rotten and rusty old blades we have to contend with under that name. The curved form of the blade is of no advantage, but rather an impediment to the use of the tool in any gardening operation. Away with it, and let the genuine trowel, honored of all ages, supersede the bogus one. You can split a brick with it or cut a sod if you want to. We are sure of good steel that will keep bright in a mason's trowel.

* * * * * * * * *

In garden reels and lines also, evolution has gone backward. Ask one of the agricultural dealers that spring up in a night with a few buckets of seeds in the window, for a garden line, and the chances are that he will show jute bed-cord, or if he thinks us as big a fool as he is, with more money, he will hand out some linen cord for window weights. Jute is the rottenest cheap fiber, while flax is little better when exposed to dampness and mildew. Cotton is ten times as durable in wet and dirt as either, and in the machine-braided form of "banding," in use in our mills everywhere, is the millennial stuff for garden lines. Enclosed please find a sample, marked in feet with India ink, as Mrs. Tarryer has used it with joy for years. Being hollow it dries out quickly, and neither kinks or breaks. "No. 64" is the proper size for the garden. "Write at once to your Congressman for it."*

* * * * * * * * *

In foolish garden reels, bogus manufacture can no farther go. It has discovered how to make the most vexatiously worthless thing possible of cast-iron—only fit to stick in trout ponds to keep thieves from drawing nets in the night—and trade is absolutely dead. People have got tired of asking for garden reels. They'd rather have sticks out of the wood-pile. Mrs. Tarryer and I went into seven "agricultural" stores in three New England cities, and in four of these stores she had to make pictures of what she was after to let the gosling clerks know what she wanted, although there were plenty of those cast-iron reels in stock!

Intelligent free-traders and protectionists, if there are any such, will perceive that the dogmas of both sides amount to nothing in respect to garden reels, while the present manufacture continues. The spool part of the reel may as well be of malleable iron, but the present models are faulty in two very important particulars: There need be no spur on the bottom of the reel to stick in the ground and chafe one's knuckles while winding up the line; for by simply turning the line under and up on the other side of the bottom of the spool, when the line is stretched, the reel holds the line fast at any desired point in its length. The second fault is that the rims of the spools are so little wider than the rough rods on which they turn that the line, inside, is cut in pieces by friction.

The two curved, convex surfaces of the spool or reel that carry the line should be $1\frac{1}{2}$ inches wide, and the whole reel should be polished in the tumbling barrel, and tinned or nickle plated. The two cast iron rods, for a good sized family reel, to hold two or three hundred feet of line, should be replaced by polished rods of best tool steel $\frac{5}{8}$ inch in diameter, neatly flattened and sharpened at the points, and with an eye turned at the top of the loose pin, while the other pin is fastened in the reel with a shoulder and a riveted nut at the top. These steel pins never break in hard or gravelly ground. Indeed the loose pin is precisely the small bar required to make holes for pea brush and the like.

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* E. H. Jacobs M'f'g Co., Danielsonville, Ct., will answer all inqniries looking towards trade.—ED.

When Mrs. Tarryer at last found one of those cast iron reels that was big enough and at all worth the trouble of buying, I was pleased to see her call for a hammer and break the cast-iron pin out of it, but I don't think the dealer knew enough about gardening to be ashamed of his league with Satan in it. Still we ought to do what we can for the souls of these dealers, and manufacturers too, who know not what they are about.

* * * * * * * * *

The makers of the aforesaid "banding," for looms, don't realize that they are in the way of making the best material for garden lines; neither will they think that it can easily be stretched and printed in foot marks with some color that is fast and will not rot the cotton, unless they are told. But the ingenious gardener will readily see that here is available matter for a little capital and enterprise in one of the many sub-manufactures we need to tie the world together.

* * * * * * * * *

In looking over what we sent you for April and May about weeding tools, I am afraid you will think that great concern will run itself; that is the danger of the best ideas printed. As of prayers in church, we are apt to feel that what is said is done. No. Prayers and print are nothing—worse than nothing—unless they move somebody to work. A curious sequel to the hoe business has come into my hands since those articles were written. We have visited two experiment stations, where sets of those tools have been in use for some years. At one of them all shapes have been valued greatly but used carelessly; at the other only the bayonet hoes and grass weeders are prized, while the thrust hoes were being ruined by rust. Yet none of these hoes are made or sold, and the art of them is liable to be lost. At the first station there was what was called a "hoe investigation," as follows:

HOE INVESTIGATION. APRIL 15, 1890, 12 M.	HOE INVESTIGATION. APRIL 15, 1890, 4 P. M.
1 Bayonet hoe in fair order.	1 Bayonet hoe in good order.
1 Bayonet hoe (at Prof. B.'s) in fair order.	1 Bayonet hoe in good order (at Prof. B.'s).
1 Grass-weeder or Mullein hoe—rusty.	1 Mullein hoe in good order—sharp as a razor!
1 5-inch thrust—very rusty. Should be remodeled in the bow by a good hammersmith.	1 5-inch thrust, very rusty and cracked—ready to go to the machinist's.
1 6-inch angular thrust—broken in the blade.	1 6-inch angular thrust—broken in the blade, but a good tool yet—shines like a n——'s heel.
1 10-inch angular thrust—rusty.	1 10-inch angular thrust—clean as a whistle and sharp as vinegar.
1 14-inch straight thrust—fair order.	1 14-inch straight thrust, in perfect order.
1 (Mr. R.'s) 7-inch straight thrust—worn out—needs new blade.	1 (Mr. R.'s) 7-inch straight thrust—needs new blade.
1 10-inch straight thrust—blade broken—needs a new one. Handle broken—skillful wood workman might repair.	1 10-inch straight thrust—blade broken and on the way to the machinist's for a new one. Handle on the way to the Directors to be directed.[*]
1 8-inch angular thrust—blade broken—needs a new one.	1 8-inch angular thrust—blade broken, but serviceable and and clean as can be.
3 hoes missing.	3 hoes missing.

All the above, barring the missing ones, hang each on his own peg where the eye of the vicious Director can reach 'em every time he goes to the laboratory. Sworn to before me, a Notary Public of the State of ——. [SEAL.]

The above bit of detailed officialism may serve to encourage our friends, the Nationalists.

* * * * * * * * *

Mrs. Tarryer insists that I shall say something of the way Grass-botanist Carruthers handles Dr. Fream in the last *Quarterly Journal* of the Royal Agricultural Society. To me it is a painful incident, but she enjoys it in a way that causes me to fear that women, if they are admitted, will bring rancor and hatred into the scientific arena. She says my fears are nonsense, and even blesses Dr. Fream for the fine example given to our young men of not being too forward with information agreeable to current trade and based on false premises. Fream got a lot of local men to send him sods from the famous meadows and pastures of England, which he "tested" in the Agricultural College at Downton, and so "proved" that the major grass of England was rye grass. This was too much. Mrs. Tarryer thought while the story was going the rounds of our agricultural press, that the sods must have come from newly seeded lands. But Carruthers, at the instigation of the Royal Society, set up hurdles right along side of where Fream's sods were cut, and proved that they were taken from *spots* of rye grass in said pastures and meadows, and were entirely misleading as average samples of the best English sward. He is more than an ordinary botanist—reads the close-grazed sod of pastures, and meadows after haying, like a book, as farmers might if they had the right names for their grasses. Carruthers evidently believes that the character of the sward of this planet can be determined by good judges with the naked eye.

From Mrs. Tarryer's point of view, Fream's rye grass sods, selected by expert farmers for striking vigor and productiveness, were the most valuable collection of lolium, for propagating purposes, ever made in England. But it does not appear that either Fream or Carruthers realized the special value of those sods at all—though the latter gentleman wasn't giving away his trade to any great extent in the article in question. Further thought about the nature of grass from across the Tweed would seem to be needed by the English mind at this juncture—intense thought, too, with maybe a bit of practical application to follow.

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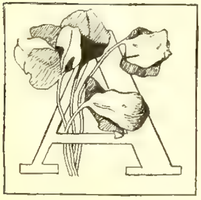
[*] The Director is an expert in woods and metals.—ED.

IS VILLAGE LIFE WORTH PRESERVING?



A WRITER IN the New York *Evening Post* (John Tunis) ably discusses some problems of village life, which is synonymous with "country life" in the minds of many people. We would not have it so; real country life is another thing. Every generation changes its way of living, often reverting in a way to the manners and customs of generations beyond their immediate predecessors, and this is marked at the present time. Of course these changes affect everything pertaining to ways of living, and so change whole communities. Village life is so different at various times and places that an assertion fitting one locality will illy apply to another. Few of us have an absolute choice of residence, and must try and modify our surroundings, rather than remove ourselves to more congenial localities. The tendency of our time is towards the cities, and each of us must decide the question from our own position. In a broad way, it is a most serious question whether village life is worth preserving as we find it now.

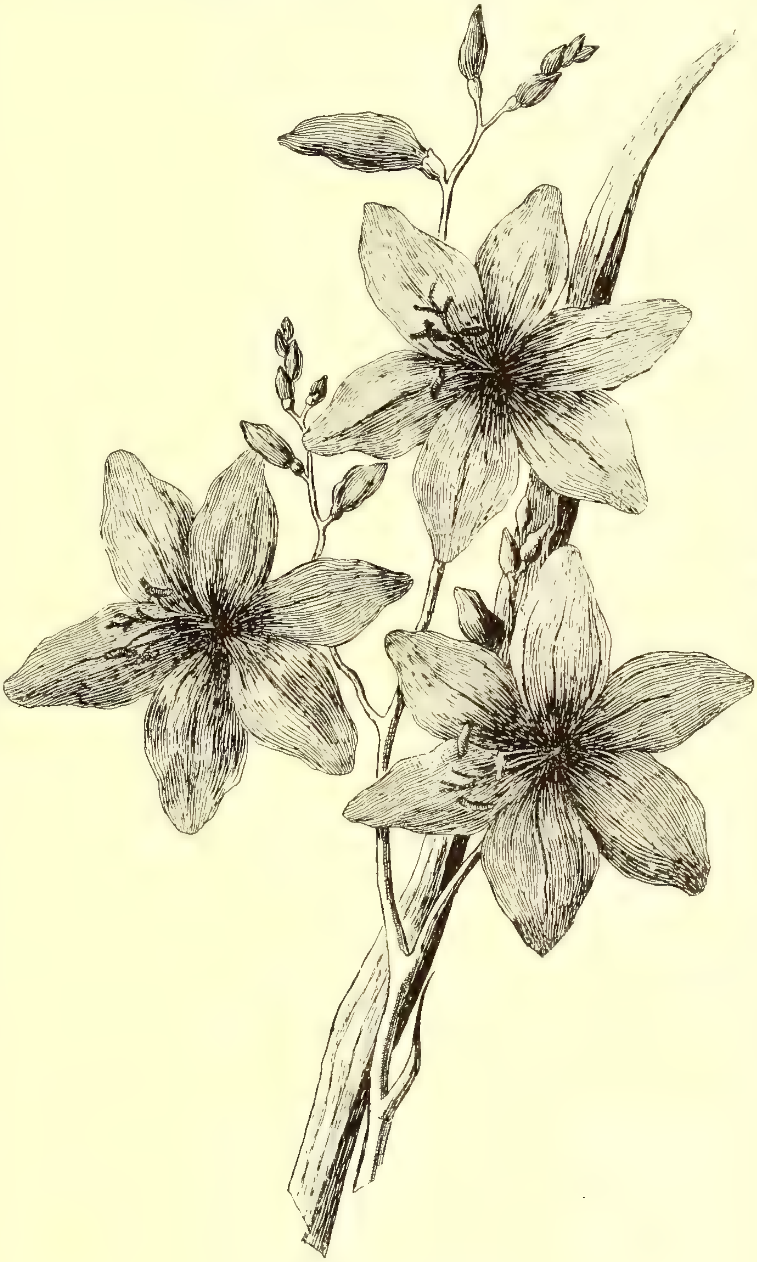
Can it be changed, or must we change ourselves? In the modern Utopias of the "Looking Backward" school of authors, who in their way endeavor to forecast the future, we are told that perfect adaptation of the means to the end will result in the greater amelioration of life to workers and dwellers in the country. Each one is to raise what his lands and conditions are adapted to and exchange with his countrymen whose crops and conditions are different. "Once consolidate agricultural interests, and the innumerable small farms are unnecessary. A great farming corporation with capital, economizing the small yet innumerable wastes of little farming efforts, would certainly have a better chance of success, and the condition of the farm hands be much improved."

How is all this known? Mankind must first be improved and all the rest will be easy. We have not seen the laborers enjoy a happy life on large estates where numbers were employed. The laborer's condition is always a hard one, for it is his hard conditions that make him a laborer. The number of small landowners has always been considered the bulwark of civil, religious and personal liberty among English speaking nations, and trusts, corporations and huge estates the oppressors of mankind. Men will have to change in the future, and then will change their mode of life. It is well to consider what are the evils incident to humanity when making comparisons between city and country. The countryman who visits town at leisure and spends his time in a succession of delights puts too high an estimate upon the easy life of the town, when he contrasts it with his uninteresting and monotonous existence of work, yet he probably has greater variety of occupation than nine-tenths of the men in town who work. The city visitor to the country, with time to enjoy its beauties, and amused and entertained at the littleness of life there, glorifies the country for its beauty and charms. It is true, on the other hand, that those who most truly love country or town are the persons who have long lived and understood either situation.

It seems understood that village life is declining both in English and America, and this gives rise to the question about its preservation. The main cause of decline seems to be that the better element in the population seeks the cities. Now the best place for alert and cultivated people to go would be where the society was congenial, and this they do, both in country and town. If they seek the wilderness it becomes a town and then a city. They are a gain to the place they go to, and a loss to that they leave, unless they have heavy moral disadvantages to neutralize the good. But people vary as much as conditions. No sweeping assertion will include the race, only a restricted class. It is true there is a greater number of fine people in large places, but we shall not all associate with them if we go there. There is much to enjoy and gain if we can take the advantage of it, in both, not without. To form a just judgement we must perceive things exactly as they are. Good authorities tell us that the Paris of Zola exists in the city on the

Seine, yet to others it is truly the center of civilization, refinement and art.

Great minds and great people have in all ages declared their preference for a home in the country and proved it by living there, yet they created the places in a sense, and their surroundings. When they were gone the place lost their prestige. It is true that the ideas popularly held about the country are often so erroneous as to amount to superstitions; on the other side, some city dwellers are so unable to adapt themselves to country conditions that their opinions are simply a compound of prejudices. Because a man is troubled with seasickness it does not follow that the ocean is not grand, healthful, beautiful and most enjoyable to thousands of others. Both city and country are healthful or not, according to circumstances. Disease and unhealth trouble them both. An invalid dependent upon the society of visitors will prefer the city, otherwise the country is first choice. City markets are cheaper and more varied as a rule; more things are to be had, but how many of us can get them? Articles find their way when there is a market for them. Hot-house grapes are to be had the year 'round in New York, yet we could not always have them if we were next door to the fruit dealer. We can generally buy fruit and vegetables cheaper in the city than country, and at less cost than we can raise them, but not as good if we know how to do it. If we take time to raise them that could be more profitably spent in other ways, they are a loss to us, but a little garden is the most pleasant and profitable means of using otherwise unemployed time that many of us know, and flowers of our own raising are sweeter to us than those bought of a Broadway florist.


Crocosmia aurea imperialis.

In European countries, where the laborers do not own the land, they are clustered together in villages and enjoy the society and recreation of each other's company, but their dancing and village festivities are abhorrent to the religious ideas and prejudices of a large part of our people, and even the wine-drinking habits of the inhabitants of grape-growing countries come in for an equal share of condemnation with the intemperance of a New England or Southern village. Isolation and imprisonment are bad, whether enforced by iron bars or force of circumstances; change is beneficial to us all. It does not alter the fact if some people become corrupt and demoralized from their experiences as travelers, that great good results to others. A home in the country does not imply complete isolation; one in the city may be desolation itself.

People in large places escape gossip and slander if they are unknown, but its circulation becomes a business with some people, and papers are devoted to what in the country is only the amusement of the idle. The spite, bitterness, envy, hatred and malice of small places are most deplorable, and above all, the littleness of life that is shown, but which escapes observation in town. City visitors are often most active in the circulation of evil reports, and their actions are responsible for most of the gossip. "Is village life worth preserving?" opens the large question about the desirability of life in general, and however we may argue it, we must take it as we find it in our day and generation, using our own influence for better or worse. Different stations in life regard it from their own points of view. Servants have settled the question about village life, and their verdict is almost unanimous that it is not worth preserving for them. There is now little selection of servants; they select their employers in the country places. Those who are compelled to do their own work pertaining to domestic offices, outdoors and in, are inclined to decide with the servants, but this does not alter the existence of the country's charms for those who can enjoy them. A flower may diffuse its perfume, but if we have no sense of smell or are away from it, can we enjoy its fragrance?

By all means let those who can afford it travel about and improve their minds and understanding. They will often be glad to get back where they started from. No doubt a depopulation of the country is going on, and the departure of the good and useful is a loss to any place, and that of the idle and corrupt a gain; although the latter being often agreeable and entertaining, are more regretted than others. The old notions of village life are seen to be no longer sound, but is it best to work a radical change, and have mankind gathered in large aggregations, and better facilities for reaching country work provided? Is it best to try and preserve the village life by a return to a higher standard or abandon it altogether? What can we do towards either end if we would? "The country is an obedient slave but an iron master; and it will be well both for those who fear and those who love it, that it should be early mastered, and then only can it also be adequately enjoyed."

John De Wolf.

NATURE'S CHILDREN IN THE GREENHOUSE.

Scattered over the pine barrens of New Jersey, in the swamps and even in the white sand, which one would hardly suppose to be capable of sustaining vegetable life in any form, we find some exquisite floral gems. I have occasionally transferred some of these to the garden, but with rather indifferent success. The open weather of this winter, however, has given me a favorable opportunity to try again under more favorable circumstances, and I have transferred several to our greenhouse. As far as practicable, I took them up with balls of earth; but, instead of planting them in ordinary soil, as heretofore, I placed them in white sand, and I find one very strong point of advantage in so doing—I can water them very freely as often as I please, and all the surplus will drain off without injuring the plants.

One of the loveliest of our pine barren plants is the May moss or pyxie (*Pyxidanthera barbulata*). It belongs, botanically, to the order of diapensiaceæ, and in general appearance very closely resembles one member of the phlox family, the moss pink, having the same prostrate creeping habit and similar foliage. The flowers are pure white and star-shaped, but its greatest charm lies in its unopened buds, which are globular, about one-eighth of an inch in diameter, white with a rosy blush, and dotted thickly over the plant, nestling like gems among the foliage. Several of these plants, which were transferred to the greenhouse about the first of January with a temperature of 60° to 70°, commenced flowering in three weeks, and on removal to a temperature ten degrees lower, they remained in bloom for weeks.

Another of these beautiful wildlings which has taken kindly to its new position is the sand myrtle (*Leiophyllum buxifolium*), a heath-like shrub, with small, closely set evergreen leaves and spreading habit. It commences flowering when only a few inches high, increasing slowly in size, and sometimes attaining a height of three feet and producing a great number of small umbel-like clusters of white flowers with exserted stamens, which give it an airy and graceful appearance excelled by few of our cultivated shrubs. These shrubs require a large pot to hold them without crowding the roots, and some which I dug with a ball of earth and placed on top of the earth under the greenhouse bench, have done the best and are now (Feb. 14th) in full bloom.

Among the most showy of our native plants is *Polygala lutea*, a biennial which produces heads of bright golden yellow flowers on stems six inches to one foot high, and is in form almost the exact counterpart of the common bachelor's button or globe amaranth; and, as in some of that family, the lower florets drop as the season advances, while new ones open at the top, so that the same flower heads continue through the season. The plants commence blooming in June and continue till frost. They are not large, and a ball of earth two inches in diameter contains most of the roots, so that a small pot will accommodate one; but there is less chance for drying if several are put in a larger pot. These do not come so quickly into bloom, but plants brought in January 1st had flower stems two to three inches high in early February.

Hudsonia ericoides is one of our heath-like plants which grows in clear sand so loose that it will not stick to the roots at all when dug. In February the hudsonia is about as dead looking as any plant could be, and no one unacquainted with it would expect it to revive; but when warm weather comes in spring, little green buds appear thickly among the dry bract-like leaves, and in May it is completely covered with bright yellow flowers. Plants of this which had been in the greenhouse six weeks were still gray rather than green, and others in two weeks had only just begun to show the life really in them, but they will make a good display long before those in the open ground. Several were potted together, so as to make, when in bloom, a solid mass of yellow, and they made fine decorative plants for Easter. We also brought in plants of our common May weed and ox-eye daisy, which bloomed promptly and freely in the month of February, to our great delight; one is not so particular in winter. Both these have handsome foliage and flowers in the style of the Paris marguerites.

WILLIAM F. BASSETT.

Atlantic County, N. J.

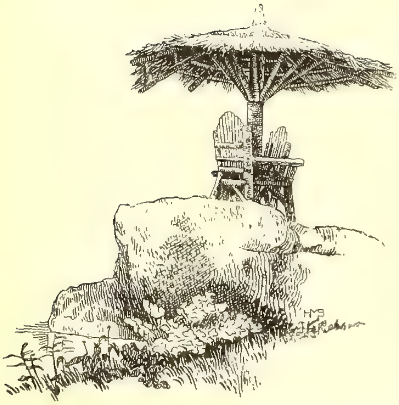
CROCOSMIA AUREA IMPERIALIS.

This plant, which seems destined to become a favorite in this country, where it is now a comparative novelty, belongs to the iridaceæ family; of the genus there is only a single species. It is also classed as a tritonia; is handsome and hardy, or nearly so, and in growth resembles the gladiolus. The color of the flower is a brilliant orange scarlet, suffused with a gold-like dust, and the plant grows about two feet high and is covered with bloom from July to October. It is a bulbous perennial, and thrives best in a light, rich, sandy soil. It is often grown in pots for room decoration and in the greenhouse; but, with proper care, it will thrive in the open ground, at least in the summer in the northern states and all the year round in those farther south. The bulbs may be planted out about the middle of April, and the plants can be treated exactly like gladioli during the summer. As soon as the stems show signs of decay, the bulbs should be taken up—in the north usually in November or a trifle earlier—and stored in dry sand, out of reach of frost, until the following spring; but they must not be kept so dry that they will shrivel. The plants are propagated by offsets or seeds. The latter should be sown in pans in a cold house as soon as possible after maturity, and where the species does well the corms increase quite rapidly. A few specimens were exhibited at the late Paris Exposition and were much admired, but, so far as we know, no display of them has yet been made at any of the great flower shows in America. We illustrate on it page 341.

LAKE MOHONK AND VICINITY.

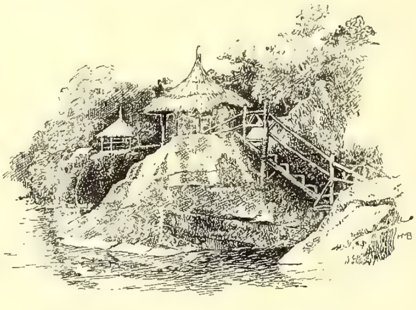
AS SEEN BY A LANDSCAPE GARDENER.

Second Paper.



THE ARTIFICIAL features of this famous resort that most attract our attention are the summer-houses, owing to the conspicuous positions many of them occupy—not that they are ever obtrusive, although so numerous. The builders probably know how many there are, but it is doubtful if anyone else does. None of the old frequenters of the place who were about could give us the information, but a partial count assured us that the number must be well within the hundreds. At nearly every prominent point of view there is one, and while seated there we can enjoy the magnificence of the scenery and inhale the exhilarating air. They afford a welcome shelter from the passing mountain shower or the too ardent rays of the summer sun. Some of the most enjoyable experiences for those fond of cloud effects are to be had during the passing storms, but the guide-book warns us not to choose certain prominent and lofty houses liable to be struck by lightning. There is, to be sure, a general similarity of character in most of these structures, the typical one being constructed of the natural trunks and branches of trees, and having a straw-thatched roof; but there is an interesting variety in the details. Some roofs are made of branches nailed close together, and where the soil admits of it, a drapery of growing vines is added.

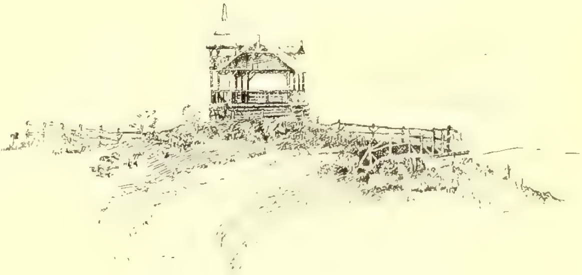
The construction of these summer-houses and the good sense shown in their location are especially to be commended. Built of materials found near at hand, they seem to belong to the place, so well do they harmonize with the surroundings. Were they transported to a dissimilar situation, they might appear as much out of place as a painted structure of shingles and clapboard on one of these wild crags. It would seem as if the straw roofs could not withstand the high winds, but in most cases they seem to have done so, and to some minds the rents made by the storms, when seen on a serene summer's day, are an added element of pleasure. The thatching is of a modern kind, not so thick or so moss-grown as the roofs of the old country. Fine copper wire is used in place of string to fasten the straw to the light frame-work beneath. Its flexibility and enduring qualities admirably adapt it to the purpose, the sharp ends penetrating the straw when, in the course of construction, it is desired to thrust them through. The use of straw in forming the backs and bottoms of some of the seats has resulted in a degree of rustic comfort obtainable in no other way, and this without diminishing in the least their picturesque qualities, but perhaps adding to them. That substances "frail as straw" have enduring qualities is shown by the way it lasts on these structures whose exposed position has made the use of iron stays and braces necessary to retain them in their places, as in the tall one on Eagle Cliff. Some little summer-houses perched upon steep, smooth rocks seem in danger of slipping away, until we perceive that a hole drilled in the rock holds one end of an iron bolt, the other end of which fits into the bottom of the wooden support above it. So sequestered are some that they attract us by their very quiet and seclusion, and invite us to rest from the fatigues of an arduous walk or the strain of gazing upon the wonders about us. Perhaps the most unique of these constructions are those upon sunken rocks in the lake, the tops of which come near enough to the surface of the water to permit building upon them. They are known as the Swiss Lake Village. As the preservation and exhibition of nature rather than the creation of beauty has been the aim in the work about Lake Mohonk, how much better are these rustic structures than would be others of more ambitious architecture. The same spirit has prevailed in the construction of the roads and other artificial works. Although it has



been necessary in some cases to expose bare earth and newly-broken rocks, they are made as little offensive as possible, and kindly nature soon assists in covering them again.

It will rejoice the lovers of forestry to see the trees cared for. Like so many other regions, this has suffered from fires and the wood-chopper. In a few inaccessible places, the trees unmolested show what they once were and what there is to hope for in the future, but most of the wood is a secondary growth that has come up from the stumps of trees cut down. In the cutting that now goes on, the seedlings likely to make fine trees are left, and in many parts of the woods a vigorous thinning out is what is most needed. Thousands have already been taken away, but the newly arrived tourist does not notice the vacancies and is sometimes inclined to sentimental objections against the removal of any; but if he is a man of sense he will, as soon as his attention is called to it, perceive the superior beauty of those woods where cutting and thinning have been judiciously done.

Although the preservation of landscape beauties already existing has been the main work here, gardening in its more restricted sense has suffered no neglect. A thousand acres of farming land, even if of rock, hilly formation, supplies the large hotel with abundant products of dairy and field. Besides numerous orchards of apples, over twenty acres are devoted to peaches, grapes, currants, raspberries and other small fruits. The delightful and extensive gardens are situated in a somewhat sheltered place just east of the hotel, and are easily reached by a dry walk over the main drive and a short path covered with pounded shale. A beautiful lawn has just been made with great labor and care. The rocks had first to be removed and then the scanty soil collected and leveled. The eye now looks from the hotel across as pretty a sheet of green as could be found anywhere of its size to the gay beds of flowers beyond. The gardens contain all the usual varieties of flowering plants and many new and rare things. Less attention is paid to bedding plants than is common at summer resorts, but hardy perennials are steadily gaining ground, and carry a load of color and wealth of bloom, from the purple flags of the iris and gorgeous oriental poppies to the last white flowers of the fall-blooming Japanese anemones. Five thousand rose bushes afford flowers in such an abundance that nearly 40,000 have been gathered in a single day. The familiar summer-houses are here, but tamed and subdued in harmony with their surroundings. Even a rough log foundation to one of them is rendered beautiful by the companionship of flowers, and those abominations of the gardener, uprooted stumps, are here gathered into a great group and glorified by coverings of clematis, that take most kindly to their uncouth forms.



The use of vines is appreciated, but not overdone. The Virginia creeper and wild clematis are encouraged to grow in the less cultivated places, but surrounding the house can be found wistarias, mingling with the annual *Cobœa scandens* and Madeira vine, while the bitter-sweet rambles with the climbing rose and sweet pea. In some places the *Ampelopsis Veitchii* can be seen creeping among the ancient lichens on the rocks. Some good shrubs have been planted near the house, and a few trees, but much might be done in this way to add a charm equal to any it now possesses. The late and early frosts are not favorable to many garden plants, and some need the hot days of summer; but shrubbery flourishes in the cool air and frequent showers of these regions near the clouds.

It is encouraging to the lovers of natural beauty to find how few acts of vandalism are committed by a crowd of people annually gathered from all parts of the country and subject to no special restrictions. To be sure, a rough class is not attracted here, but the experience here goes to show that a large and expensive hostelry can be well supported in an out-of-the-way place, without the adventitious attractions so often said to be necessary to maintain a hotel. However well kept the house may be, it would not succeed were it not for the attractions offered by nature in the surroundings. There is but one Mohonk, but there are still many very attractive places unoccupied, and visited only by those who destroy and do not preserve. Landscape beauty is more and more every year coming to have a commercial value, oftentimes greater than that of the most productive soil. With the increase of population and of the continued defacement by man, the remaining traces of the primeval will have a value proportionately far beyond what they now possess. Time was, and not so many years ago, when a whole range of mountains could be bought from the Indians for a trifle; but he who would possess an attractive site now must pay roundly for it in good money. It is to be desired that those who now hold possession of such things will keep them for improvement in the true sense of the word: not by great outlay of money, but by preservation and judicious landscape work, which will in time bring better returns than shares and stocks, and always be better for the world at large.

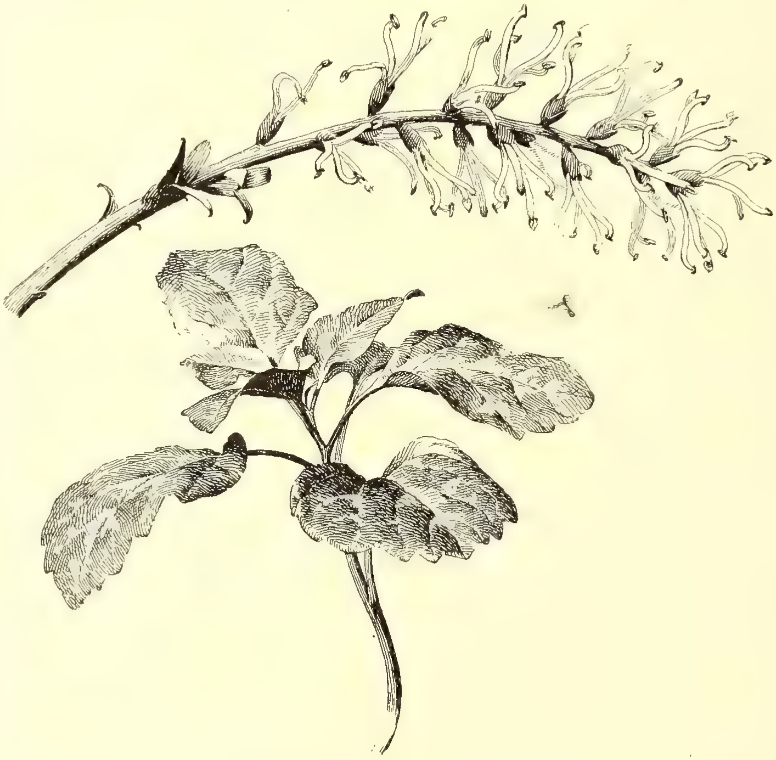
PACHYSANDRA PROCUMBENS.

There is no familiar or common name for this interesting plant. The generic name is from the Greek, meaning "thick stamen." The plant belongs to the spurgeworts (Euphorbiaceæ), where also the better known ricinus, croton, box-wood (*Buxus sempervirens*), etc., are placed.

Quite a little may be said in favor of the pachysandra for certain situations, while it is curious in that its male and female flowers are somewhat peculiarly placed, as well as odd in themselves. They are borne in long, naked spikes (the males above), and the four thick, white, prominent stamens answer very well in the place of petals, as one may judge from our engraving, which is drawn from nature, the leaves reduced in size two-thirds and the spike one-half. These spikes appear in earliest spring and in considerable numbers, overtopped by the leaves, which are from six to nine inches tall and narrowed at the base to slender petioles. The plant spreads quite rapidly by creeping root-stalks, and is one of the few evergreens that enjoy almost complete shade. It will flourish equally under bushes and trees, and even in the dense shade of woods, retaining its foliage freshly green during the entire winter.

The flowers as can be seen, have no petals. The male flowers consist merely of fleshly white stamens and a calyx. The three lower ones are the females, those above the males. The females consist of three styles, recurved and stigmatic down the entire inside and subtended by several bracts. The male flowers have an agreeable, the female a somewhat unpleasant odor. *Pachysandra procumbens* is found wild in Virginia and Tennessee, southward.

E. S. C.



PACHYSANDRA PROCUMBENS. FLOWERS NATURAL SIZE; LEAVES ¾ NATURAL SIZE.

DAMPING-OFF.

SOME GOOD OPINIONS AND PRACTICE CONCERNING THE MALADY.

DAMPING-OFF is a common and often serious injury to young plants under glass, either in houses or hot-beds. It appears to be a variable difficulty, and there are many opinions concerning it. In fact, all are not agreed as to the proper definition for damping-off. The following letters, from good observers, give some of the various observations and practices concerning it:

FROM THOMAS MEEHAN, *Germantown, Pa.*—Damping-off is a term usually restricted to cuttings or seedlings just potted. In all cases it is applied to the sudden rotting of the structure near the ground. I suppose no intelligent gardener ever questioned the statement that it is caused by a minute silk-like fungus, the scientific name of which is not material here, which destroys as it grows. The usual remedy with watchful propagators is to take out the cuttings as soon as the fungus growth is first detected, and change the soil or sand before resetting them. The fungus seldom appears in a new cutting bench—possibly from the spores or mycelium not having found a home in it. We have been careful to have fresh clean sand, and clean benches, and hence have little trouble from fungus. Possibly sulphur—the good gardener's panacea against mildew—scattered over the surface, would be useful, or probably the new remedy, copperas water, which proves an admirable fungicide. No one plant is more liable to damp-off than another, so far as my experience goes.

FROM PROFESSOR W. F. MASSEY, *Raleigh, N. C.*—Damping-off is the sudden collapse of the tissues of a seedling or cutting in contact with the soil or sand. The cause, so far as my present knowledge goes, is essentially the same in both the cases of seedlings and cuttings. My idea is that the watering of the soil or sand encourages a growth of minute algæ on the surface which furnishes food for the rapid spread of the mycelium of minute fungoid parasites, which are destructive to all organized tissues in their path. The minute hyphæ form a water-proof coating over the surface and the seedlings perish not only from the fungus but from drought and want of air. It troubles most in a close atmosphere with high temperature and strong bottom heat.

The best preventions are abundant ventilation and avoidance of a high temperature overhead in the propagating house. When seedlings or cuttings begin to damp-off the best remedy is to clean up and transfer the sound ones to fresh soil or sand. In a propagating house for cuttings, no wood should enter into the construction of the cutting bench. Make the bottom of slate and the sides of brick and cement. Seed pans of earthenware are better than wooden flats for sowing seeds. The whole subject needs careful study, and I hope ere long to be able to give more exact information.

FROM PROFESSOR S. T. MAYNARD, *Amherst, Mass.*—Damping-off, as understood by the practical gardener, is that rapid decay of cuttings and tender or soft-tissued plants which takes place in a night or a few hours, and is accompanied by a webby or downy fungus growth on the outside of the parts of the plants. As understood by the botanist, it is the rapid development of a parasitic fungus growth which, under favorable conditions, quickly destroys the tissues of the host plant. The cause may be traced largely to the conditions of moisture and heat surrounding the plants, either under glass or in the field. A very moist, close atmosphere, with a too high temperature, is sure to bring on the damping. It is most troublesome in the cutting-bed, where a very moist condition must be maintained, but under the same conditions of moisture and heat, plants often damp-off when growing in pots or even in the open field. Cuttings of all kinds, coleus especially, after they have become chilled, and lettuce, are most often injured by damping off with us.

Preventive measures are by far the most important and satisfactory. (*a.*) Water the cuttings in the morning only. (*b,*) Keep the temperature as low at night as is permissible for the kind of plants grown. (*c.*) If the bed or soil in pots become too wet, expose to the sun's rays in the latter part of the afternoon. (*d.*) The use of evaporated sulphur will large prevent the fungus growth, but not wholly if the temperature is allowed to run very high. This is used by melting or boiling sulphur in shallow kettles heated by a kerosene lamp or small stove, and should be used in the early part of the evening, for two or three hours, twice or three times per week.

FROM JOHN GARDNER, *Jobstown, Pa.*—In my opinion, damping-off is a decay in plants caused by a fungus, superinduced by atmospheric conditions, as, for instance, a warm and moist atmosphere. Such an atmosphere, of 70°, will cause damping-off in forced beans. In cuttings, damping-off is the decay of the lower end of the leaf-stalk. This is particularly marked in the case of cuttings of indoor grapes. If cuttings are made of wood from which the leaf-fall has not been natural, a portion of the leaf-stalk adheres to the cutting, and the moisture of the bed causes it to decay. If the house is moist and warm the infection soon spreads to all the cuttings.

In propagating beds I endeavor to have all soil free from decaying vegetable matter. I have known sandy soils taken from a sweet potato patch to rot all seeds and cuttings put into it. The particles of roots and tubers remaining in the soil were, in my opinion, the cause of the mischief. In such soils in a warm atmosphere, the damping-off fungi will appear in ten days.

I guard against damping-off by avoiding a *high and moist* atmosphere. If the trouble shows itself, I use flour of sulphur put on the soil dry, and then dry out my houses somewhat.

From Edwin Lonsdale, *Philadelphia.*—Damping-off is the term used when seedlings and cuttings in a young state, *rot* off. The cause, sometimes, may be from excessive moisture, and, more frequently than the casual observer is aware, is caused through insufficient moisture. If either cuttings or seedlings become really dry, so that the soil or sand in which they are growing exhibits the unmistakable signs of dryness, look out for damping-off, after the next watering; for unless very rare judgement is exercised in giving water, disastrous results will surely follow. The summer time is the worst season of the year for damping-off, in our operations here. Of course, that depends largely upon the class of plants in hand. But generally speaking, in the summer more watchfulness is necessary, on account of the excessive hot and dry weather which usually prevails at that season of the year. Take mignonette as an example. When in a seedling state this plant is more inclined to damp-off than anything that I can at this time call to mind. Yet I believe the trouble comes more from the lack of moisture than too much of it. As an illustration: when we grew mignonette, a few years ago, for winter flowering, we had to sow the seed in the hot and dry summer season. Owing to its proneness to damp-off, water was given with great caution. But the elements taught us that we did not know what we were about, for, on one occasion, the day after the seed was sown, there was a heavy thunderstorm, and where the water leaked through onto the bed, where the seed was sown, the young plants sprung up in great abundance, and they remained stronger and better all through the season than their neighbors. Ever since that time we have kept the seed bed thoroughly moist from the day the seed is sown until the young plants are quite strong. In order that there may be no misapprehension in this matter, it perhaps will be necessary to state, that, because the treatment indicated suited the germination of the seed and for a time sustained the young plants, it does not follow that the soil in which plants are growing should be kept in a state of saturation all the time.

There is also a thread-like fungus which attacks cuttings in propagating beds, and seedlings in seed-pans, but generous supplies of water applied directly on the seedlings and cuttings will hold it to a great extent in check, and the young plants will be stronger and better than if allowed to exist in dry sand or soil and a dry atmosphere.

From B. M. Watson. Jr., *Bussey Institution, Jamaica Plain, Mass.*—Damping-off is a contagious disease attacking plants and cuttings just above or below the surface of the soil, resulting in death or serious injury. In my experience the cause is principally a fungus growth which fills the soil, and covers the surface with a mass of thread-like bodies, identified by Professor Farlow of Cambridge as the mycelium of *Pythium omnivora;* in no case have we failed to notice this present in a greater or less degree, but I have reasons for thinking other fungi may be concerned. The growth of this fungus seems to be due to the combination of too much moisture and too high a temperature; the ravages are more noticeable when plants are grown in a house warmer than they like. Plants are troubled most when grown under glass, chiefly in February and March, when a variety of seeds are sown, many of them almost unknown to us. It is serious on all germinating seeds, and young seedlings making their first growth; I have also found it on cuttings in sand, on cinerarias in eight-inch pots, and on red cedars and other hardy plants in a propagating frame.

Preventives and Remedies. With cuttings, use a fairly cool house, avoid confined air, ventilate thoroughly, and admit as much sunlight as possible without wilting; pot off or reset in fresh sand when any symptom appears. By these means we have not been troubled with attacks for several years. When a close atmosphere is necessary, guard against too much moisture and keep an even temperature. When large plants like cineraria are injured, it means the temperature is too high or too variable, and the remedy is simple. With young seedlings and germinating seeds, the difficulties are greater; for preventives, use a fresh sandy soil, free from any recently decayed organic matter; use well drained pots, pans, or boxes; avoid over watering, particularly in dull weather, shade in the middle of the day only, and keep the temperature as low as the nature of the plants will permit. Do not sow seeds of plants like carnations and pansies in heat. The best remedy is to prick off into fresh soil as soon as any fungus appears; this can easily be done with the stronger growing kinds. Young plants of which nine-tenths of the root is eaten off can sometimes be saved. Fine seeded and slow growing varieties are not so easily managed. We scatter on dry sand at first; for worse cases, we sift on sand so hot that it can hardly be handled; this will sometimes check the fungus growth or make it possible for the later coming seeds to succeed where the first perished. We are now experimenting in seed sowing in live sphagnum with a little sandy soil added.

From Professor L. H. Bailey, *Cornell University.*—Damping-off is a term loosely applied to the decay of cuttings or young plants at or near the surface of the ground. The first appearance of the trouble is a brownness of the parts. The stem soon becomes constricted at the point of attack in many plants, and the plant soon falls over. In many cases, the top of the plant may remain alive and fresh for some days after it has fallen over.

It is commonly supposed that damping-off is due to a fungus. The fungus which has been called the "potting-bed fungus" in Europe is commonly supposed to cause the difficulty, but the subject is little understood in this country. It is by no means certain that all damping-off is the same. It is possible that two or three distinct troubles are called by the same name. Damping-off is most troublesome under glass and among plants which are crowded, but it may occur in the nursery-row out of doors. Certain conditions of atmosphere and culture induce the attack of the fungus. In my experience and observation, a soil dry beneath and wet on top affords the best conditions for damping-off. It is a common fault to merely sprinkle the propagating bed, allowing the under soil to remain dry and powdery. The operator may suppose that he has given enough water to wet the soil throughout. This conditions of affairs is particularly apt to occur when water is applied from a hose, for I find that there is then a tendency to apply too little rather than too much. The amount of water can be guaged more readily if applied from a pot.

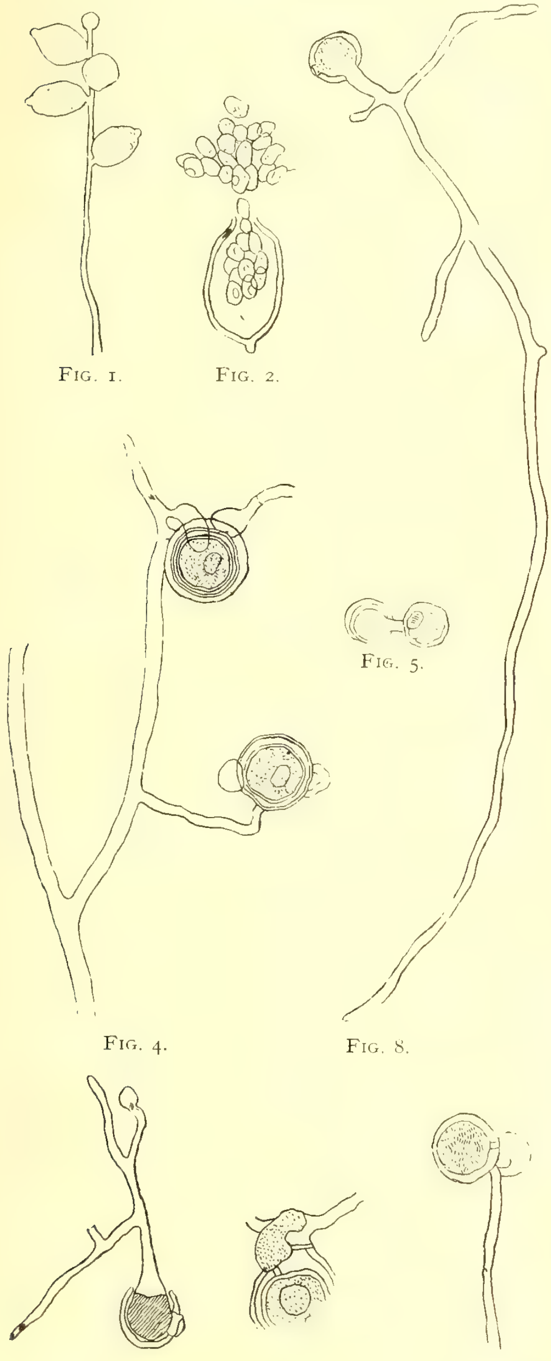


Fig. 1. Fig. 2.

Fig. 5.

Fig. 4. Fig. 8.

Fig. 6. Fig. 3. Fig. 7.

There is little to be done in the way of a remedy for damping-off, for unless the plants are particularly valuable it will scarcely pay to attempt to save them after they are attacked. But preventives can be employed. Keep the plants stocky, never allow them to crowd, give plenty of air, and endeavor to keep the soil uniformly moist throughout.

From Professor A. B. Seymour, *Harvard University.*—In his "Enumeration of the Peronosporeæ of the United States," Professor Farlow says: "In this country the species of pythium have not been sufficiently studied, and no mention is made of them in this paper, although they possess a decided agricultural interest, since one species apparently causes what is known in some parts of the eastern states as the potting-bed fungus, which is very destructive to young house plants in the winter. Other species are known in decaying plants in damp ground." This is the extent of our knowledge of the subject in this country. In Europe there are several species of interest in this connection.*

In 1878 DeBary observed plants of *Cleome violacea* which turned brown near the surface of the ground and also in spots on the stem and leaves. The plants wilted and became foul or dried up. The next year they were worse and several additional species of flowering plants were attacked. All the discolored tissues were found to contain mycelium, sometimes of several kinds, but only one kind was present in every case and that was *Phytophthora omnivora* (or *Pythium omnivora*), a species closely allied to the potato rot fungus. Conidia-bearing branches of the mycelium (Fig. 1) grow out through the epidermis and the conidia germinate by forming zoöspores (Fig. 2). The resting spores (Fig. 3) correspond to those of the grape mildew. I do not understand that this fungus lives in the soil.

Pythium is a fungus allied to phytophthora, but apparently lower in rank, *Pythium vexans* was found by DeBary growing on potato tubers which had already been partly rotted by the common potato rot fungus, *Phytophthora infestans*. He found that the pythium would not attack a healthy potato plant. It was also true that *Phytophthora omnivora*, though growing on a variety of plants, will not attack the potato. Fig. 4 shows part of the mycelium and two oospores of *Pythium vexans*, Fig. 5 is an oospore germinating by the formation of zoöspores. Fig. 6 shows a similar spore germinating by forming a tube. Either process may occur.

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*Bop. Gaz., 1883.

With regard to *Pythium DeBaryanum*, DeBary says: "This pythium is, as Hesse has shown, a dangerous parasite. It is disseminated in garden soil to a remarkable degree. Therefore, one may be easily convinced that it almost always seizes upon plants subject to its attacks when they are sown in such earth and kept wet. One can be quite sure of obtaining the fungus by this means for examination at any time. The fungus may perhaps lie dormant in the earth in the form of mycelium, which it does at any rate in the form of resting conidia and oospores, which may retain their vitality through months of dryness. From the plant first attacked the mycelium spreads over the moist earth and then attacks the neighboring stock. The injury and death of seedling phænogamous plants sown in wet places have in this, as Hesse has shown, almost always their immediate cause."

This species, then, is the one which will most likely prove to be the cause of damping-off in America. Fig. 7 contains an unripe oospore. Fig. 8 is one that has germinated.

Recent culture of the fungus which I have made confirms the supposition that damping-off is caused by fungi.

The figures are all from DeBary. Figures 1–3 represents various parts of *Phytophthora* or *Pythium omnivora*: 1, conidia (x90); 2, germination of zoöspores (x225); 3, a ripe oospore with remains of antheridium (x375). Figures 4–6 show *Pythium vexans*: 4, mycelium and oogonia (x600); 5, oospore germinating by formation of zoöspores (x300); 6, oospore germinating by formation of a tube (x300). Figures 7 and 8 are *Pythium DeBaryanum*: 7, oogonium containing unripe oospore, antheridium attached (x375); 8, germinating oospore (x250).

"A NEEDED EXPERIMENT."

After reading the article, "Some Literature," in the January number of THE AMERICAN GARDEN, in which the author presumes upon a wide acquaintance with experiment station literature, it is somewhat surprising to hear from the same source, under the heading "A Needed Experiment," in the February issue, that the question "how shall we cut our potatoes for seed," is "new and vital to the potato." True, it is vital to the potato grower, but it is very far from being "new" or a question that "has not already occupied the attention of scientists." There has been more than one man who, according to the writer of that article, is entitled to "be * * * * considered a benefactor of his race." Few subjects have received more attention from experimenters.

For at least one hundred years, investigators have been studying this question, and to-day the general testimony of experimental research is the same as when, in 1807, Mr. Dickson in his great work on agriculture, wrote: "It seems probable from the various experiments that have been made upon the subject, that the middle-sized whole potatoes, and the cuttings of large ones, are, in general, more productive than either the smaller sort of whole potatoes, small cuttings, or the eyes or shoots alone." In support of this statement Mr. Dickson gives tables showing the results of experiments carried on yearly from 1790 to 1795 (excepting 1793).

Long before experiment stations were established in this, or any other country, this subject had received attention, and we have only to examine the reports of the U. S. Department of Agriculture, beginning with the issue of 1847 from the Patent Office, to find that it has for many years been a live question among potato growers.

Referring simply to work on this subject at the experiment stations of this country, we can point to the records of more than thirty distinct trials, published in their reports and bulletins.

Many foreign publications, as well as the columns of our own agricultural papers, contain also the records of work in this line, performed by both public and private experiments.

It is now a well established fact, that, speaking in general terms, "the larger the amount of seed potato planted, the greater the corresponding crop." This does not mean that the crop is *proportional* to the seed planted, but simply that it increases to a certain extent as the amount of seed is made larger. When very large quantities of seed (forty to sixty bushels per acre) are planted, the increase is oftentimes not enough larger to pay for the increased cost of the seed. *The most profitable amount of seed to plant is the medium; that is a whole potato or a piece weighing three or four ounces and containing from two to four or five eyes.* Experiments almost universally show that it is never safe to trust to a piece with only a single eye, per hill.

The above conclusions have been reached after careful study of all available records, and it will be seen that the principal one, regarding the proper amount of seed to plant, is not different from that recorded nearly a century ago. Several experiment stations are, at present, at work on the subject, and further data are continually being added to that already at hand.

Maryland Experiment Station. W. H. BISHOP.

[We did not suppose it to be necessary to explain that R. T. Choke was writing in sarcastic vein!—ED. AM. G.]

JUNE BUDDING.

The stocks should be small, not over one-half inch caliper—one-fourth or one-third is better—in free flow of sap, and possessed of leaves or small leafy branches below the insertion of the bud, so that when the stock above the bud is cut away to start the bud, it may not die for want of leaves. I have lost heavily by having the bud put in too near the ground in young seedling peaches. The great heat of the season—about mid-June here in Texas—soured the sap of the stock before new leaves could be developed, and the stock died. At least five or six leaves should be left on a stock below the bud.

The bud is cut from a scion having buds just mature enough to show the tip of the bud, and in which the wood is mature enough not to break or snap. The scion or "stick" should be taken from a healthy, vigorous tree, and should be nearly as large as the stock to be budded. The bud is taken from the scion in the following manner: Cut with a very sharp, thin blade, beginning one-half inch below bud to one-half inch above, and at a depth about one-third the way through the scion, leaving the slice attached at upper end. Then with a dextrous half turn of the scion between thumb and finger, with the edge of the blade, bearing on the scion only heavily enough to cut just through the bark at upper end of slice, the bud is ready to take off. Then catch the bud and slice between thumb and finger, deftly twitching the slice, twisting downward on the scion, pinching gently on the edges of the slice, which will cause the bit of bark bearing the bud to slip off the slice of wood still held to scion by its upper end. Still holding to the bud, insert its acute lower end under the lips of bark (see Fig. 3), raised by a deft turn of the blade on the stock previously to taking off the bud (see Fig. 2). Hold to the bit of leaf-stem between the thumb and finger, which was left at the bud when trimming the leaves from the "stick" of buds, and gently, steadily press the bud down, making it lift the bark of stock as it goes in. Push down till the entire piece of bark with bud in its center is resting under bark of stock with sap-face of bud-bark resting against sap-face of stock (see Fig. 4). Now tie with any convenient string—bass bark, prepared strips of corn-husk, jute yarn raveled from burlaps, or raffia—so that the tie will not loosen, and the operation is complete.

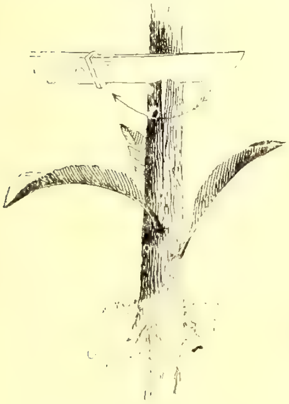


FIG. 1. Opening matrix on stock.

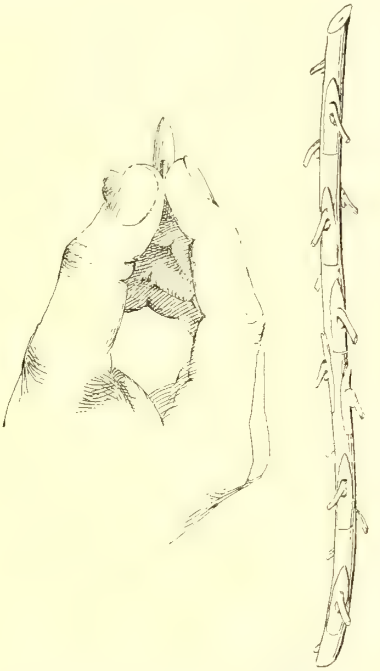


FIG. 2. A "Stick of Buds," prepared for twitching off with thumb and finger, for inserting in stock; and manner of holding the bud.

The matrix on the stock for receiving the bud is prepared by taking off a few leaves, if in the way, where the bud is to be inserted; then, with the blade, with edge perpendicularly over the center line of the stock, pressed just through the bark, draw up one inch; then set the blade crosswise of the perpendicular cut at top and diagonal to stock, and press just through the bark and give a little turn of the wrist to the right, causing the blade to lift the two lips of the matrix (see Fig. 1). The illustrations show the operations better than pen can describe them.

No one need expect to bud very successfully without considerable practice. An expert budder will insert in nursery row in ten hours' work, when stocks are trimmed and scions are brought to hand, from 2,000 to 3,000 buds, and sometimes even more, in peach-budding.

It is very important that the tier keep close upon the budder, and that the buds be tied-in closely and the tie secured from slipping; but the point of bud should never be tied directly upon.

In June budding, the tie should be cut loose in six to eight days after the buds are inserted, by drawing the edge of the blade up the back side of the stock across the tie, severing every strand. The top of stock should be cut off at same time, just above the bud, as shown in Fig. 5. In a few days after the top is cut off, the sprouts starting from below and around the bud should be *gradually* taken off first just about the bud. As the bud grows into a scion and gets to be some six inches long, all the sprouts from the stock should be removed, the last to come off being on the side opposite the bud. Two to three times going over are necessary to insure best success in this part of the work.

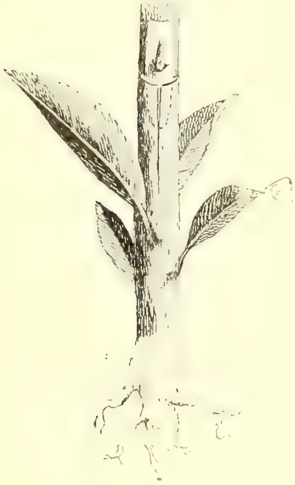


FIG. 3. Bud entering matrix.

The peach is more often June-budded than any other tree, and in this climate, with everything favorable, a tree four to five feet high can often be produced in one season, equal to northern one-year trees with two-year root. Such stock is very smooth and beautiful.

I have put fine new tops on two and three-year-old peach, by cutting back in winter and May-budding the young shoots. The danger in this lies in removing sprouts and top of budded shoots too rapidly, causing the entire stock to sicken and die for lack of foliage.

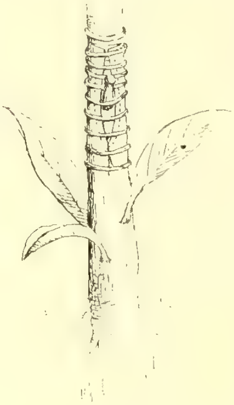


FIG. 4. Bud inserted and tied.

The plum trees grown from Marianna cuttings can be June-budded successfully to other plum or to peach and apricot.

I see no reason why other fruits, and some shrubs, may not be successfully June-budded, if the stocks can be gotten in condition early enough to get the buds started before the intense heat and drouth of July and August come on; these conditions make success difficult to attain.

Denison, Texas. T. V. MUNSON.

MORE ABOUT JUNE BUDDING.

Although the practice of budding young seedlings of the peach and some other fruits in the early part of the first summer has been carried on for more than fifteen years, it is yet comparatively a new thing. The objects to be gained are the production of a budded tree the first year, thus saving the expense of one year's growth in the nursery; the advantage of transporting a small tree instead of a large one; and enabling the nurserymen to dig the trees with a larger proportion of root, thus lessening the danger of loss in transplanting. The peach is perhaps the most easily operated upon of any of the fruits, as the seedlings grow very rapidly and make a stock sufficiently large to insert buds upon in time for them to grow and mature healthy wood before fall.

Although the term "June budding" is commonly used, my experience has led me to think it should be more properly called "July budding," as nearly all my successful experiments have been made in Kansas during the early part of the latter month.

The process is indeed very simple, as all that is required is a healthy, vigorous stock and buds which are sufficiently developed to grow after having been inserted. This, of course, must be left to the discretion of the operator, and "bud sticks" will have to be taken, of which a large portion of the tip end will have to be cut off as too tender or immature.

The buds are inserted in the usual manner, but the wrapping should be of some rather elastic material which will readily yield to the rapid growth of the tender stock. I have found strips of old muslin very good, although I have used bass-wood bark with a reasonable degree of success. As soon as the buds are set the top of the tree should be cut back severely, or the stem cut partly off about four inches above the bud, and bent over in order to check the growth of the top and force the bud into growth. If the stock is cut off immediately, the remaining part is liable to die. As soon as the bud has grown a few inches in length the entire top may be cut away close to the shoot.

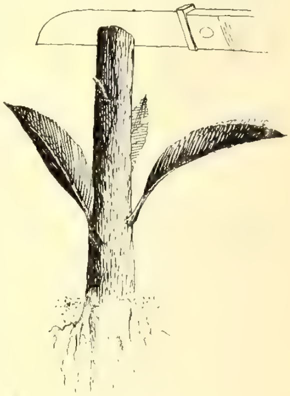


FIG. 5. Stock cut back, and tie removed, to start bud.

Washington. H. E. VAN DEMAN.

A RACE OF FLOWERLESS PLANTS—V.

HOW FUNGI INJURE PLANTS.

IN EARLIER times the opponents of the "germ theory" of disease in plants were commonly ready to admit the presence of a fungus—in fact, to determine its presence was a simple matter of observation; but they contended that it merely accompanied or followed and did not cause the disease. Their position was the logical one to take until the opposite could be clearly shown to be true, and to show that the fungus causes the disease, makes it necessary or at least very important, to show in what the noxious effect consists.

In some cases, as in corn smut, the fungus causes injuries of such a character that they are evident to all. In others, the character of the injury is much more difficult to determine. There are several kinds of injuries which a fungus may produce in the plant it attacks, and often several may be caused at the same time.

The one first to be mentioned is the most universal and comes necessarily on account of the essential nature of fungi. Fungi have no green coloring matter, and for this reason cannot supply themselves with food from the earth and air as green plants do; they are compelled to take their food from some ready-prepared organic matter, *i. e.* from some living plant or animal or from their dead remains. If they take it from the latter, they are not true parasites, but are called saprophytes. Parasite fungi are those which take their food from their "host," that is their supporting plant (or animal) while it is yet alive. Thus an infected plant is deprived of the food which it has supplied for its own use; the fungus thrives, and the host plant suffers more or less from starvation. Many fungi, such as grape mildew and its allies, have special organs (suckers) (Fig. 1) for absorbing nutritive material from the cells of plants, and the cell walls are also punctured, ruptured or otherwise injured. The suckers and mycelium which enter a cell sometimes kill it and sometimes allow it to grow on with reduced vitality, a continual prey.

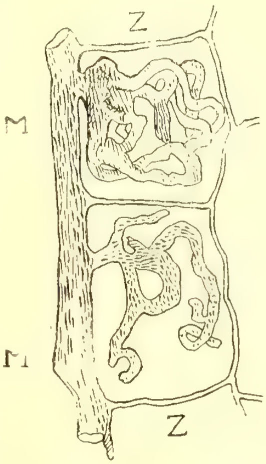


FIG. 1. SUCKERS IN CELLS.

If the green parts are the ones attacked, as most frequently they are, the power of the plant to provide fresh food for itself is also impaired.

The light may be kept from the leaf to some extent, as when the fungus forms a layer over the surface. Sometimes leaves are covered with the exudations of insects ("honey-dew") and a black fungus grows on this, covering the surface of the leaf. Also, the active power of the leaf-green is less on account of the weaker vitality to provide food for itself.

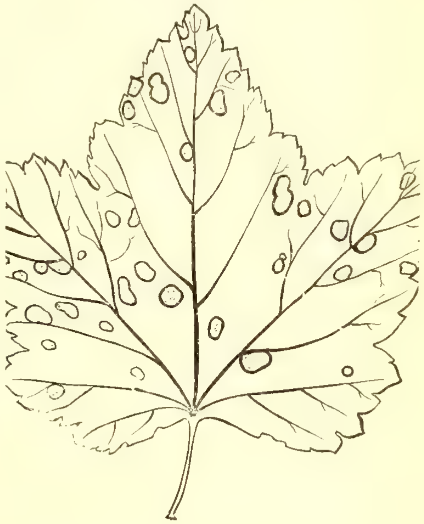


FIG. 2. SPOT DISEASE OF CURRANTS.

Sometimes portions of the leaf are killed and appear as brown dry spots, as in the spot disease of the garden currant (Fig. 2) and many other plants; or portions even die and fall out, leaving holes. When the damage is less severe, spots of various colors are seen, more or less characteristic of some special disease. Fig. 3 shows spots on mignonette leaf. Still other fungi cause the entire leaf, or a considerable portion of it, to become withered and dry, and it is usually the free end of the leaf and the leaves nearest the base of the stem that suffer most, as in rusted cereals. Certain plants, as Canadian thistle, attacked by their peculiar rust, wilt in hot sunshine, afterwards reviving; but healthy thistles do not wilt.

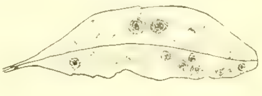


FIG. 3. SPOT DISEASE OF MIGNONETTE.

Another common effect is to change the size of a plant, to make it grow either less or more rapidly than a healthy plant. We might easily expect a diseased plant to grow less rapidly, but strangely enough the reverse is very common. A spurge on which a certain common cluster-cup is growing, and a blackberry infested with orange rust, have smaller leaves but taller and more erect stems, an effect resembling that of insufficient light, as upon vines on the shaded side of a trellis, or potato sprouts in a cellar. The scab fungus may retard growth on one side of an apple or pear, while the unaffected side continues to grow. The mildew so common on plants of the mustard family often contracts the leaves of pepper-grass, but causes considerable swellings in the stems of a nearly related plant. An *exobasidium* which grows on the leaves of blueberry bushes, contracts them; other forms of the fungus growing on the allied azalea and andromeda produce inflated sacs often several inches in diameter. Many other fungi cause swellings and sometimes further distortions of the stems and leaves on which they grow. The swelling is usually composed in part of the abnormally multiplied cells of the host plant; this may be seen in the "curl" of peach leaves, the smut of corn (Fig. 7) and the common "cedar apple" (Fig. 6) which grows on red cedar trees. Another fungus of the "cedar apple" group, growing on the trunks and branches of white cedar, causes swellings, of which some become as large as a man's head.

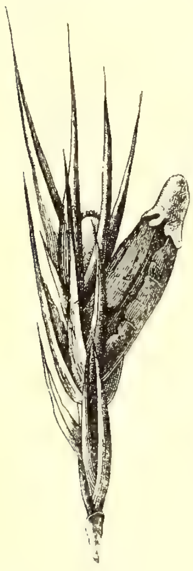


FIG. 4. ERGOT.

Injuries caused by fungi are not confined to the green parts of plants; woody stems, roots, flowers, seeds and fleshy fruits all have their parasites.

One of the slime-molds attacks the roots of cabbage, causing the disease known as "club-root." The black knot of plum trees is a familiar example of diseased and distorted stems. A certain fungus attacks the flowers of the blackberry and distorts them so that they appear double; and the disease is known as "double blossom." Various kinds of smuts are noted for attacking only certain organs or parts of their hosts; one on the plants of the pink family fruits in the anthers; the smut of wheat destroys the ovary; the bunt of wheat destroys the interior of the ovary without much affecting the outward appearance; other species growing on the troublesome grass-weeds, sand-bur and finger-grass, destroying the entire inflorescence; but one on fox-tail, while destroying the ovaries or seeds, produces almost no distortion. Corn smut is quite exceptional among the smuts, in that it grows and fruits on all parts of its host except the roots.

The young ovary is remarkably affected by the action of certain fungi.

The ergot fungus replaces the young ovary of rye by a horny mass as shown in Fig. 4. Plum pockets are ovaries of a plum tree converted into inflated sacs by the action of a species of taphrina (Fig. 5); the smuts mentioned above and others attacking ovaries and seeds convert them into a mass of powdery spores. One of these found growing on a smart-weed is very beautiful under the microscope. The scab-fungus, attacking the newly formed fruit of the pear, kills it and it drops off. Many leaves of various plants (e. g. of the currant, Fig. 2) fall prematurely when attacked, apparently by a process which, while abnormally induced, is yet similar to that which promotes the falling or leaves in autumn. Contrasted with premature ripening we have retarded development, diseased parts remaining green while healthy parts have become brown and dry with age.

Ripe fleshy fruits are more liable to the attacks of fungi than any other vegetable productions. The fungus may injure their quality or only their appearance and market value. This is true of the scab-fungus of apples and pears. Some fungi attack fruits only while growing, attached to the tree; others, like the potato rot, attack the growing plant and continue their ravages in the harvested product. Some of the common saprophytic molds of the household become parasitic when opportunity is offered, as mucor upon strawberries.

In the field and orchard, valuable plants are frequently liable to infection from others of less value; wild plums breed black-knot for cultivated plums, wild grapes and Virginia creeper have mildews whose spores may be carried to the finest varieties.

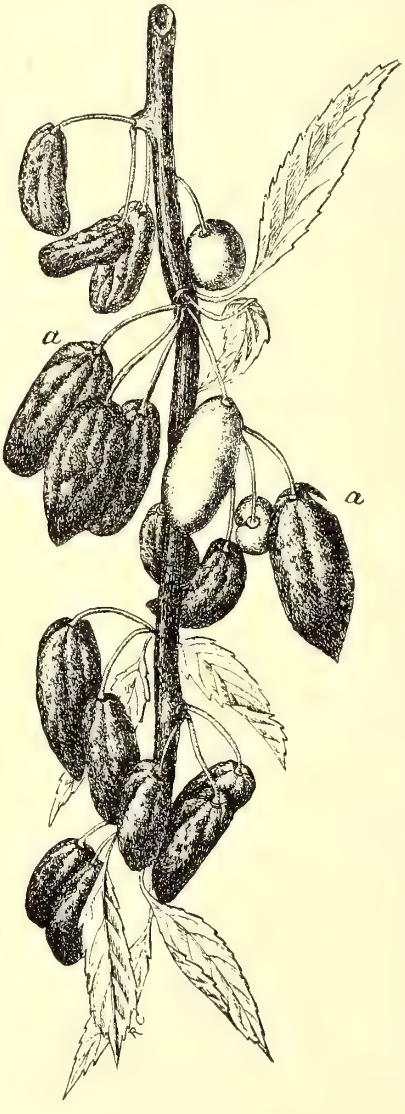


FIG. 5. PLUM POCKETS.

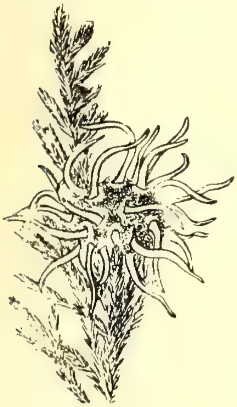


FIG. 6. CEDAR APPLE.

One *stage* of a fungus, in some cases grows on a wild plant, another stage on a valuable crop; the cedar fungus infects the apple trees with rust and the barberry fungus carries rust to the wheat and oats. There are immense numbers of fungi of other classes which are believed to have different stages of growth, perhaps in most cases on the same host, but their histories are unknown. In almost no other field of botany would successful research yield richer results than in this.

To sum up, we may enumerate seven ways in which fungi injure their host plants: by (1) depriving them of nourishment; (2) impairing the power to assimilate food supplies, cutting off light or weakening the vitality; (3) abnormally accelerating or retarding growth, producing distortions; (4) affecting not only green parts, but also roots, stems, inflorescence, flowers and fruits; (5) causing leaves and fruit to prematurely ripen (?) and fall; (6) producing decay in matured fruits and vegetables, both before and after gathering; (7) infecting valuable plants, by means of spores grown on less valuable plants. Several of these causes are often active at the same time in a diseased plant, and it is difficult to say in many cases to which cause the greater injury is due. There can be no doubt of the vital importance of the whole subject, however, to our agriculture, and of the necessity for intelligent action looking toward the prevention of fungoid ravages in our cereal crops.

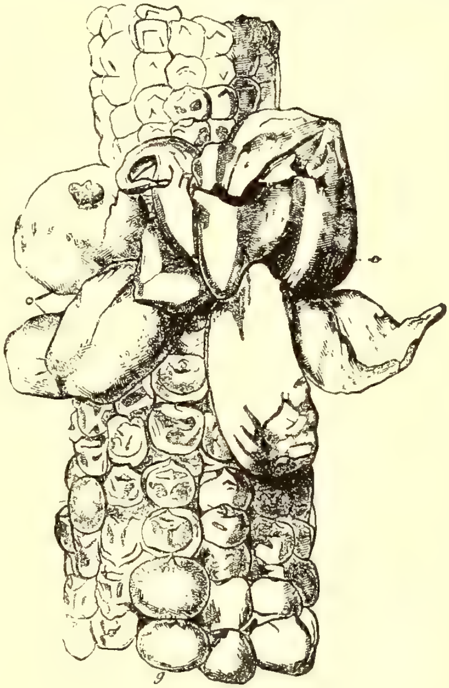


FIG. 7. CORN SMUT.

Harvard University. A. B. SEYMOUR.

THE RURAL NEW-YORKER'S ANSWER TO JOSEPH HARRIS.

Mr. Joseph Harris's article on "Fertilizers for the Garden" in the May number of this journal is no doubt as sound as a dollar in the general principles which it advocates; but the instances which he cites in proof of his conclusions are possibly open to criticism.

For a year or so past certain writers have advocated a more generous use of nitrate of soda, in a way to lead those who have given little thought to chemical fertilizer questions to assume that it is in itself a fertilizer which will insure a profitable increase of crop regardless of the needs of the soil. The *Rural New-Yorker* has therefore repeatedly cautioned its readers not to use nitrate of soda (or nitrogen in any soluble form) unless it is known that the land is already proportionately supplied with available phosphoric acid and potash. Nitrogen is neither more nor less valuble to the gardener or farmer than is either of the others. It is by far more costly, and, while the phosphates and potash remain in the soil for subsequent crops, nitrate of soda leaves us even before the current crop is harvested. We do not need to tell our distinguished critic this. He knows it, and has taught it in his writings for many years. And yet we place Mr. Harris among those who, while cracking up nitrate of soda, has *not*, in every case or in most cases, emphasized sufficiently the insuperable importance of a corresponding supply of minerals.

Mr. Harris assumes that the chemical fertilizers of to-day contain too small a quantity of nitrogen; that the minerals (potash and phosphate) are the strong links, and that a deficiency of nitrogen is the weak link of the chain by which the crop, in due proportion, will be diminished. This is true without a doubt in a majority of cases, and it is well that it is true, for if the farmer is to lose a part of the money he pays for fertilizers, he would better invest it in food constituents of a lower cost which will remain in his soil, than in nitrogen at a higher cost, which takes its leave after a single season of service. If a farmer from experimentation is fairly confident that his land is especially short in nitrogen, let him buy fertilizers with a high ratio of nitrogen; but if he knows nothing about it, the very best thing he can do is to buy high-grade complete fertilizers and use them until by experiment he finds that more nitrogen will profitably augment his crops. Then he may wisely add nitrate of soda, salts of ammonia or organic nitrogen as he, by trial in an inexpensive way on small plots here and there, may find them serviceable. The advocacy of the use of one-sided, low-priced fertilizers on the part of the mixers ("manufacturers") and their agents, has done incalculable harm in the way of inducing those who till the soil to purchase fertilizers which do not furnish the full or partial meal which their land demands. The consequence is that they denounce fertilizers *in toto*. Thus, bone or South Carolina rock, kainit, superphosphates, ammoniated superphosphates, sold under high-sounding, taking names and at prices far below those of high-grade brands, are tried and condemned, not for what they really are, but as "*fertilizers*" which are assumed to furnish everything in the way of plant food that the name represents. So it is that in every case gifted and well-known writers, like Mr. Harris, whose words of advice are taken without question, should place all possible emphasis upon the economy of purchasing either high-grade complete fertilizers, or of "incomplete" fertilizers only as the farmer or gardener has learned from experiment that his land responds fully to bone, to potash or to nitrogen, and that the other constituents are not at present needed.

Mr. Harris says that it is a matter of surprise that the editor of the *Rural New-Yorker* does not see that his own experiments demonstrate that, so far as the production of potatoes is concerned, his worn-out soil was more deficient in nitrogen than in any other constituent of plant-food. "Superphosphate and potash, without nitrogen, did no good. They could produce no effect without nitrogen. Nitrogen alone on one plot produced 183 bushels per acre," or, we may add, 105 bushels above the *average* of the plots of natural soil *without* fertilizer. It is true that if this single trial be taken as a basis for comparison, Mr. Harris's reasoning is logical enough. It should be stated in fairness, however, that this little nitrogen-plot yielded more for some reason than any other nitrogen-plot either of that year's experiments or of those of preceding years. Another plot which received not only the same quantity of nitrate of soda per acre (200 pounds), but also 200 pounds of sulphate of potash, produced but 90 bushels of potatoes to the acre, or 12 bushels above the natural-soil plots. Again, raw bone (1,000 pounds), furnishing perhaps three or four per cent. of ammonia, gave but 77 bushels per acre. Again, in our similar experiments of the year before, nitrate of soda (200 pounds) gave a yield but little more than the average of the natural-soil plots. The several no-fertilizer plots yielded an average of 143 bushels to the acre. Nitrate of soda (200 pounds) yielded but 125 bushels; sulphate of ammonia (120 pounds) yielded the same, nitrate of soda (200 pounds) and dissolved bone-black (400 pounds) yielded 168 bushels. Nitrate of soda (200 pounds) and sulphate of potash (300 pounds) gave 233 bushels per acre. Nitrate of soda (200 pounds), dissolved bone-black (400 pounds), sulphate of potash (300 pounds)—a complete fertilizer—gave 217 bushels. The Mapes Potato Manure (800 pounds) gave 257 bushels to the acre, while in the later experiments quoted by Mr. Harris 1,200 pounds of the Mapes (3.70 nitrogen guaranteed) gave a yield of 273 bushels to the acre.

From a glance at the experiments carried on at the experiment grounds of the *Rural New-Yorker* during the season to which Mr. Harris alludes, it is admitted that nitrogen alone gave a greater increase over the unmanured plots than either potash or phosphoric acid or both. It is just as evident, withal, that in no instance was a large crop raised except when a high-grade complete fertilizer was used. Whether a smaller quantity of the fertilizer and an additional dose of nitrogen would have given as large a crop we have no proof one way or the other. If we were striving to raise the largest possible yield per acre, we would not use nitrogen in the form of nitrate of soda alone, but in the blended forms of nitrate of soda, sulphate of ammonia, dried blood, urate of ammonia and other organic salts of ammonia found in Peruvian guano, all of them soluble, but in varying degrees. Moreover, we should supply them, especially on light and fallow land, in minimum quantities consistent with experience, on account of their expense and the liability of loss by leaching. It is easy to supplement nitrogen to a growing crop by top-dressing, if it is thought that it will prove serviceable, as, especially in the form of nitrate, it is exceedingly prompt in its action. On a portion of the same impoverished field upon which the potato trials alluded to were made, the effects of a dressing of 150 lbs. to the acre of nitrate of soda on corn were plainly visible 50 feet away three days after the application in the darker color of the leaves as compared with the rest of the field which had received potash and phosphoric acid only.

Our great authority, Sir J. B. Lawes, grew potatoes on the same plots for nine consecutive years, from 1876 to 1884 inclusive. The average yield from the use of 400 lbs. of ammonia salts alone was 103 bushels per acre; that from 550 lbs. of nitrate of soda was 104 bushels. The same amount of ammonia salts with the ash elements added (complete) produced an average for the nine years of 325 bushels per acre. Nitrate of soda (550 lbs.) with the ash elements added, gave 300 bushels per acre. Farmyard manure (16 tons)—an average of six years—gave a yield of 253 bushels per acre.

Mr. Harris remarks that the 200 lbs. of nitrate of soda, used in several of our experiments to form complete fertilizers, can be bought for $5. Three and a-half per cent. of nitrogen equals 70 lbs. in a ton. Seventy lbs. of nitrogen are contained in 368 lbs. of nitrate of soda, which at 2½ cents per lb. (Mr. Harris's figures), would cost $8.70, and not $5, as he states. Still we agree with him that for potatoes it is an ill-balanced fertilizer in most cases, not, however, because it contains too little nitrogen necessarily, but because it does not exist in varied forms and also because the potash is too low by half for soils deficient in potash. Where a large crop is anticipated it is always safer to use an excess of food constituents, particularly of those that do not waste by leaching. Phosphoric acid is, next to nitrogen, the ingredient oftenest deficient in soils. Nine-tenths of the fertilizers used in England and America are mainly phosphoric acid. Potash in many soils, however, is present in liberal quantities, and it would be unwise to supply it in full rations unless a known deficit exists.

If you err at all, gardeners and farmers, it is better to err on the side of economy. Phosphoric acid will remain with you to feed subsequent crops. So will potash. Know that your soil needs more nitrogen before you apply it in liberal doses. Nitrogen costs a lot of money, and the higher the price of experiment ingredients, the less the farmer should apply it without due discrimination. We say give the soil all the phosphoric acid you choose. You will rarely overdo it. Give it potash according to its needs, as nearly as you may. But be gentle and conservative in the use of nitrogen, unless you are positive it will give you full returns. It is a ruinous luxury.

We may every one of us bear in mind that if phosphates materially increase our crops, we have evidence, to a certain extent, that nitrates are the less needed at present; if potash increase the crop, here is evidence that nitrates are the less needed. If both phosphates and potash fail, then let the experimenter add nitrates in varying quantities from 100 to 300 pounds to the acre, and thus in a safe, inexpensive way find out approximately what his land needs.

Readers of THE AMERICAN GARDEN may be pleased to know that a somewhat extended series of experiments are being carried on at the Rural grounds (now substantially controlled by The Rural Publishing Company) in the hopes of throwing some additional light upon the nitrogen problem as it may affect the potato crop grown upon an impoverished soil. An epitome of these experiments is show in the following table.

Plot 1. Natural soil.
" 2. 440 lbs. *high-grade potato fertilizer* per acre.
" 3. 440 " " " " " and 55 lbs. nitrate of soda.
" 4. 440 lbs. fertilizer and 110 lbs. nitrate soda.
" 5. 440 " " " 220 " " "
" 6. 440 " " " 330 " " "
" 7. Natural soil.
" 8. 880 lbs. fertilizer and 55 lbs. nitrate soda.
" 9. 880 " " " 110 " " "
" 10. 880 " " " 220 " " "
" 11. 880 " " " 330 " " "
" 12. 880 " " " *no* " " "
" 13. 1,320 " " " " " " "
" 14. 1.320 " " " 55 " " "
" 15. 1,320 " " " 110 " " "
" 16. 1,320 " " " 220 " " "
" 17. 1,320 " " " 330 " "
" 18. Natural soil.
" 19. " " and 110 lbs. nitrate soda.
" 20. " " " 220 " " "
" 21. " " " 330 " " "

Then, other plots receive varying amounts of a fertilizer strong in nitrogen (ammonia 7.50), supplied in many different forms, and a lower per cent. of phosphoric acid (4.50) and 10.50 per cent. of potash.

E. S. CARMAN.

SEEDS AND SEED-GROWING.

Seventh Paper.

THE TOMATO (*Lycopersicum esculentum*).

IN THE whole list of garden vegetables, there is none so susceptible to treatment as the tomato; none better repays good attention; none shows neglect so plainly, both in quantity and quality of fruit. It is, moreover, capable by careful selection of the highest development, and will as quickly deteriorate if the principles of selection are not closely observed and the highest cultivation given it. Although the tomato has been in cultivation for more than three hundred years, it is within the past fifty years that its cultivation as a garden vegetable has become general, and not until within the last twenty years has its importance been fully realized. With the exception of the potato, it is the most extensively grown of any garden vegetable, and like the potato, can be had every day in the year on the table. Of course not fresh from the garden, but from the canner, whose skill in putting up has arrived at that degree of perfection, that for cooking purposes but very little difference between fresh and canned tomatoes is noticeable.

Its importance, both in the vegetable garden and for commercial purposes, is so great that every effort known in the gardening art has been employed in the production of new varieties. That, during the last fifty years the species has been greatly improved, there is not a question. But that there has been any great improvement during the last twenty years is a disputed point. It is true that among the new varieties annually sent out there seems to be, either in form, productiveness, earliness or keeping qualities, some progress made. At the same time, have we any varieties better than the Early Smooth Red, the Trophy or the Excelsior of twenty years ago? And if so, will we be able to keep them?

These are important considerations; upon them depends all there is of importance in the growing of tomatoes for seed purposes. It is therefore necessary to study carefully the origin of new varieties, and how to perpetuate them.

All the varieties under cultivation have their origin in *L. esculentum*, of which but little is known, other than that it was introduced into Europe from South America in 1596. That there were different varieties at that early date is quite likely, although we have no mention of them, other than that there were "the common large red love apple, the yellow love apple and the smaller love apple." However this may be, certain it is that all our new varieties are descendents from these, either by seedlings, or, as it is claimed in the case of the Ignotum, as a "sport."

It matters little how any given variety originated, other than to show how types can be secured and retained. It is a general impression that the varieties have a natural tendency to deterioration, and that new ones must be produced from seed to replace them. To this grave error let us reply, by saying that varieties do not run out, provided proper care is taken to keep them up.

The writer saw the operations of one of the largest tomato seed growers in our country, last year. In a field of ten or more acres, there was not a single plant of which the fruit should have been saved for seed purposes. Everything had a starved appearance, a fact the grower acknowledged, as he got more seed on poor than on rich soil. There was no care whatever in selection; ripe and unripe fruit was put into the crusher, and the seed all saved. He admitted this was no way to grow and save seeds, "but," he asked, "what could I do, for the price?" The price was not more than half what it actually costs to produce good seed. In this case, and it is a rule that will apply to all others, competition was the parent of deterioration.

On the other hand, the finest crop of tomatoes I ever saw growing, without regard to variety, was of the Trophy, and that only last season, which was generally considered the most unfavorable for the tomato that we have had for many years. The grower of these, a man of rare intelligence, bought the seed from Mr. Waring the first year he sent it out, and he has not grown any other since, but has each year carefully selected the best for seed purposes. The result is an improvement. The fruits are more even in shape and size; they ripen up to the stem perfectly, and what is more important, they ripen to the center, producing but little seed. A fault with this variety when first introduced was that the center was hard and unpalatable. The same care this grower gave this variety will improve any other, if the same is grown under favorable conditions. If on a very heavy clay or in very light sandy soil, an improvement in the tomato is impossible.

Another experiment or case noted was with the Acme, one of the best for the table, although its color is not a favorite one with the market gardener. A practical florist has grown this variety alone since its introduction, and has taken special care in selecting his fruits for seed. The crop of last year on about twenty plants was marvellous. Four of the tomatoes, not above the average in size, weighed four pounds; and this strain ripens perfectly, and is free from rot or cracking, to which the Acme is liable.

CULTURE.

While the tomato will produce a fair crop under almost any circumstances, there is no crop that will more amply repay good care and attention. The soil best suited to it is a light loam, which should be, for a general crop, made rich; in fact there is no possibility of getting it too rich, if the plants can have light and air in proportion. The finest crop we have ever seen grown was produced as follows: The hills, eight feet apart each way, were dug out to the depth of two feet; in the bottom of each was put half a bushel of well rotted manure, which was well packed down; the hole was then filled with loam and manure in equal proportions. The plants (Trophy) were started in a hot-bed, and transferred to hills the first week in June. The plants were set with care, so that they did not receive a check in growth, and came quickly into fruit, the six hills producing more fruit than the family of eight persons could consume.

For field culture the soil should be plowed deep, the manure being applied broadcast. Harrow smooth, and mark out the hills six feet apart each way; and at the bottom of each hill put in an additional shovel of well rotted manure, which should be well incorporated into the soil. In setting the plants always puddle them in, using at least a pint of water to each plant; press the earth, or mud, firmly about the plant; then cover the surface with dry soil, very loose. This may seem expensive, and so it is. To set an acre of plants in this way will cost four times as much as in the ordinary way, but the yield will be more than double. An acre will produce, if the soil is suitable, with the application of fifty dollars' worth of manure, 800 bushels, which is more than double, perhaps treble as much as can be grown when planted in the ordinary manner.

STARTING THE PLANTS.

The usual custom of sowing tomato seed thickly in the greenhouse and hot-bed, is one that should not be followed, as the plants grown in that manner are usually inferior to those that nature produces by her own sowing in the open ground. Much can be gained by sowing the seed about the first of April in a frame, or in a greenhouse without artificial heat. A gain of four weeks is possible, but to secure that the plants must be properly handled. They must be pricked out as soon as they have made the second pair of leaves, into shallow boxes of light soil, or what is better, into thumb pots. If in boxes, the plants should be two inches apart each way, and they must be given all the light and air possible, when the temperature will warrant it, in order that they may make short and vigorous plants. When three inches high they will require another shift; in the boxes set them three inches apart each way, in which they can grow until removed to the field or garden. The plants in pots should be frequently shifted, never allowing them to become root-bound; they should, moreover, have all the room that can be conveniently given them, but it will answer if the pots touch each other.

Although this may seem an expensive way of producing plants, where early fruit is wanted it is economical. For field culture, plants may be started in a cold-frame by sowing the seed about the middle of April, covering with a sash at night or on cold days, and pricking the young plants out as in the greenhouse, one inch apart each way, transplanting to the field when the weather will permit, the first of June being sufficiently early. It is a great mistake to put out tomato plants too early; there is nothing gained, but on the contrary, in the case of cold winds, a great loss of time by the check the plants will receive, will be the result.

FIELD CULTURE.

After the setting of the plants, keep the cultivator at work; go through the rows both ways as frequently as possible until the vines prevent, and by that time weeds will not longer be troublesome. But it is not to kill weeds that the cultivator is kept going, but to make plants; cultivation will secure both results.

STOCK SEED.

The importance of saving stock seed should not be overlooked by the seed grower; upon him rests the responsibility of purity and perfection of the variety. For this purpose, a few plants should be set apart, but given no better care than is required for the general crop. As soon as the first fruits are an inch in diameter, cut them away; the first fruits set are rarely perfect in form. The next setting will be on the branches, and if these develop satisfactorily, do not allow any others to grow, but keep the flowers cut as they appear until the fruits begin to ripen. After that the plants may be allowed to fruit, but not for seed purposes. The first that is allowed to ripen will have received all the strength until maturity and will be sufficient for stock seed for a future crop. It is always economy to keep an abundant supply on hand; it is perfectly good, if kept dry, for four years, but a small saving annually is a wise precaution.

In saving seed for stock, never save from a plant that is not vigorous and fruitful, or if the fruit in any way should be other than absolutely true to the type. In some seasons, for instance, either from extreme heat and drought, or from too much moisture accompanied with cold, the plants will not have that vigor requisite for a perfect development of seed. In such it is far better not to save stock seed, but rely upon previous savings.

For a general seed crop such selection cannot be practiced, but under no circumstances should a plant that shows any weakness or disease be allowed to remain.

SAVING AND CLEANING THE SEED.

The tomatoes should not be picked for seed until perfectly ripe; then gather and grind in a machine made for the purpose. The best machine is made with a cylinder about a foot in diameter, with wooden teeth two inches long and an inch in diameter; set in the same manner as in an ordinary threshing machine, with a bed to match, in which two rows of teeth are set in the same manner. Run the tomatoes through this machine into a large box, with fine wire netting at the farther end to allow the juice to run off. After the grinding is done, run the pulp through a sieve with a half-inch mesh; this will let all the seed through and save out a large proportion of the pulp, which can be used for catsup or be thrown away. The seed and remaining pulp should then be put into a cask of any convenient size and allowed to ferment, which it will do in from 24 to 48 hours, according to the weather. If it is quite warm, the seed ground one day can be cleaned the next. If cool, it may have to wait two or three days before fermentation is complete. It can then be readily washed out. If running water is convenient the operation is an easy one, as the seeds will settle to the bottom of the cask and the pulp and light seed can be poured off. After washing, the seed should be put into a bag and wrung out to get out as much water as possible, which will hasten drying and leave the seed whiter. Cleaning should be affected as quickly as possible after the operation is commenced in order to make a clean sample. In drying, spread out thinly on sheets, or better, on light frames covered with fine wire cloth, and set in full sunshine, keeping it stirred frequently.

The various types under cultivation have their parentage as follows:

TOMATO, common, *Lycopersicum esculentum.*
" Cherry, *L. cerasiforme.*
" Pear, *L. pyriforme.*
" Currant, *L. pimpinellifolium.*

Long Island. C. L. ALLEN.

TOMATOES AT CORNELL EXPERIMENT STATION.

Bulletin X, of Cornell University Agriculture Experiment Station gives the results of Professor Bailey's experiments with tomatoes. In most of his conclusions we heartily coincide. The writer has long insisted that frequent transplantings are absolutely necessary to the production of early fruit. We have frequently had people tell us that they had rather have tomato plants raised in the open ground than hot-bed plants. So had we, if by hot-bed plants are meant the slim, crowded, almost rootless plants produced by sowing seed in a late hot-bed and growing them without transplanting until set in the open ground. Such plants are practically worthless. I fully agree, then, with Professor Bailey when he says that "frequent transplanting of the young plant, and good tillage, are necessary to best results in tomato culture."

Years ago I insisted, and have seen no reason to change my opinion, that no amount of forcing could overcome the matter of age necessary for the plant to attain before fruiting. I have never yet seen a tomato that will produce ripe fruit in less than four months from the seed, and most of the larger sorts require a longer time. Some years ago one of the stations, in an experiment with tomatoes, claimed to have proved that the forwarding of the plants under glass was of no advantage in the early production of ripe fruit, though every market gardener of experience knows that exactly the opposite is the fact, and the grower who would expect to compete with his neighbors in the production of early tomatoes without the use of glass would be looked upon as an ignoramus. In the experiment referred to it appeared that the "forwarding" under glass referred to was sowing the seed about middle of April in a hop bed and transplanting these at same time with plants raised outside. That such "forwarding" is useless any practical gardener will admit, for these tender, small-rooted plants underwent a check which gave the robust out-door plants a decided start and they should have been called "retarded" plants. Professor Bailey's experiment showed that "plants started under glass about ten weeks before transplanting into field gave fruits from a week to ten days earlier than those started two or three weeks later, while there was a much greater difference when the plants were started six weeks later. Productiveness was much increased by the early planting."

This is "forwarding" under glass, properly speaking. Plants from seed some ten weeks before setting in the open ground must perforce be transplanlanted two or three times under glass, and at each transplanting and gradual change to a coolor atmosphere make a gain in vigor and hardiness. This is a point which Professor Bailey does not mention, but which is of importance in the production of the best and earliest plants—that while the plants should be started in a high temperature they should at each transplanting be placed in a cooler temperature, with plenty of ventilation to secure a stout and stocky growth.

My practice is to sow the seed in boxes in a hot-house (65° night temperature), about two and a half months before time to set in open ground. (This would make it here the last week in January.) As soon as the plants are up large enough to handle, they are transplanted into other boxes about two inches apart and placed near the glass in a house where a night temperature of not more than 50° is maintained. As soon as they make two pairs of leaves above the cotyledons the growing tip is pinched out, and about four weeks before putting in the open gronnd they are transplanted into cold frames, putting about 65 plants to a sash, 3x6 feet size. Every effort is then made to give them exposure to the outer air on warm days and finally full exposure a few days before final transplanting. They will then be found to be stout plants, with two or three branches, and a main stem as thick as one's finger, but not more than eight or ten inches high. They will easily lift with a mass of roots and soil larger than a man's fist, and will go right on growing and making fruit. The pinching has caused an early development of the side shoots which always produce the first fruit.

Professor Bailey well says that a "tall weak plant with a cluster of bloom at top" is not worth planting. Such clusters of bloom do not give the earliest fruit, if they give any, and the plant stands still until the side shoots appear. Another point in which my experience corroborates Professor Bailey's conclusions, is that liberal manuring not only does not retard to any appreciable extent the earliness of the crop but largely increases the smoothness and quantity. The exception to this is the case of a heavy clay soil. In such a soil, naturally fertile, a heavy coat of manure made too rank a growth of vines and a greater tendency to rot; even then there was an improvement in smoothness and solidity.

Professor Bailey says varieties "run out." No doubt this is usually the case, because of the tendency of tomatoes to "sport" continually, thus requiring great care in the saving of seed to keep a type pure. But that they necessarily run out, I am not ready to concede. Our improved tomatoes are composite varieties, and therefore have a tendency to break toward some one or other of their ancestral stock. But did Professor Bailey ever know an original variety of the tomato to run out? The Cherry, Plum and Pear tomatoes are as pure to-day as ever, and the old, big, rough, Mexican tomato will always reproduce itself, the "Garfield" for example. But put the Mexican tomato into the smooth skin of the Cherry, and it at once tries to get out.

Professor Bailey names as best for market, Ignotum, Beauty, Mikado, Perfection, Favorite and Potato-Leaf. I do not object to any of these except Mikado; with us it is entirely too rough and uncouth for a market tomato, but is good for table and very productive. Neither can I agree with him in condemning Dwarf Champion for market. With me, and I grew several thousand of it last year, the Dwarf Champion is the earliest, smoothest tomato of good and even large size I have ever grown. While not of the best quality for family use, its tough skin and the fact that it gives nearly the whole of its crop early make it valuable for distant shipments. With us it is by no means small, being from good medium to large. It is evidently a recent cross between Acme and the French Tree tomato, as last year many plants in our patch reverted to these two types, and some others had the fruit of the French Tree with the vine of the Acme, and its rotting quality, too, while the pure Dwarf Champion, was as free from rot as any I ever grew. For strictly early market sort I think the Dwarf Ccampion is as yet at the head of the list.

Bulletin X is one of those practical papers for which the Cornell station is becoming noted, and for distribution to the class of cultivators for which it is intended is worth a great deal more than scientific formulæ and tables which they cannot comprehend.

N. C. College of Agriculture. W. F. Massey.

DELUDING THE PUBLIC—KILLING THE TRADE.

BRINGING THE SEED, PLANT AND TREE TRADE INTO DISREPUTE.

FOR THESE THINGS AND MORE, ARE THE INTRODUCERS OF PSEUDO-NOVELTIES RESPONSIBLE.

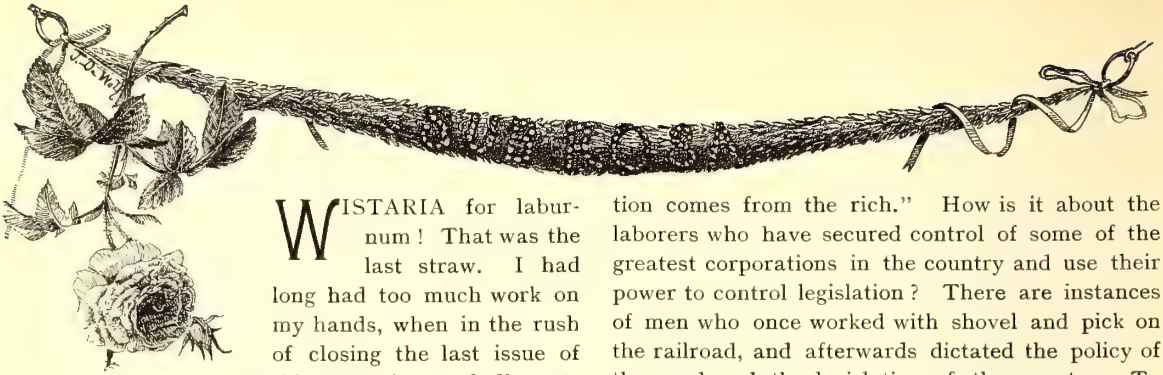
TRADE SOCIETIES, STEP INTO THE LINE OF REFORM AND DRIVE THE RASCALS OUT!

The legitimate seedsmen, nurserymen and florists have felt for years the disgrace which has attached itself to them by reason of the introduction of old plants, seeds and trees under new and deceptive names. The matter has reached a point where a powerful effort must be made to stop the illegitimate work. All of the trade societies will meet before another season opens, and as a suggestion by the adoption of which, modified or enlarged, it may be possible to bring about the needed reform, THE AMERICAN GARDEN respectfully submits the accompanying preamble and resolutions for the consideration of the by-law committees of the Society of American Nurserymen, the Society of American Florists and the Seed Trade Association at their meetings during the present summer.

WHEREAS, The obnoxious practice of introducing old varieties of seeds, plants and trees under new and fanciful names is bringing disgrace on the honorable trade, and causing a falling off in their business; and whereas, the buying public are coming to look upon the trade as irresponsible frauds, by reason of the action of unprincipled dealers in the trade, be it therefore

RESOLVED, That this Society cause to be printed a complete and accurate list of its members, such list to be published at such time in such papers and magazines as the Society shall deem best. That the horticultural press be requested to call the attention of its readers to the existence of said list, and to the fact that it may be had without charge, upon application to the proper officers of this Society. And be it further

RESOLVED, That if any member of this Society shall advertise, offer, sell, or cause to be advertised, offered or sold, any known variety of plant under a new name, such member's name shall at once be stricken from the aforesaid list, and the offending member be warned, suspended, and if persistent in his selling of such so-called "novelties," be finally expelled from this Society.



WISTARIA for laburnum! That was the last straw. I had long had too much work on my hands, when in the rush of closing the last issue of this magazine, and distracted by numerous other duties, the picture of two laburnum racemes on page 283 was allowed to pass as a wistaria! Then I knew that the manager of The Rural Publishing Company had no further business as editor of THE AMERICAN GARDEN, and Prof. L. H. Bailey, for some time a corresponding editor, was at once engaged to take full editorial charge of the magazine. Professor Bailey's work needs no further introduction here. His contributions have been so full of life, brightness, variety and sterling practical value that they have attracted widespread attention and favorable comment. As horticulturist of the Cornell Experiment Station, he has won a place second to none in America as an investigator and practical horticulturist. I resign the editorship to his control, in full confidence that he will make the magazine what I have tried to—the first in the world for horticulturists and lovers of nature—*the* out-door magazine for country and suburban dwellers, workers and pleasure seekers everywhere.—E. H. L.

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COMES UP the labor question perpetually, the same old controversy in differing aspects, although the methods so generally futile in the past do not seem to be abandoned! A prominent movement is the first convention of the "Farmers' and Laborers' Union of America," held in St. Louis early in December, and countenanced by the Mayor of the city and Governor of the State. We are glad to know that class legislation is condemned, especially as we are often assured that farmers and laborer's votes are the main source of the power often so ill-used by our legislators. At various times we have heard of movements intending to influence legislation in favor of the laborers. Is not this class legislation? We consider the laborers as a class. There was also considerable talk about the "middle" classes; the chairman, in the course of his remarks, said: "It is an acknowledged fact, proved by all history, that purification always comes from the poorer and middle classes, while corruption comes from the rich." How is it about the laborers who have secured control of some of the greatest corporations in the country and use their power to control legislation? There are instances of men who once worked with shovel and pick on the railroad, and afterwards dictated the policy of the road and the legislation of the country. To what class do they belong? All classes? Or can they be assigned to the "laborers" or the "rich," as convenience may determine? It always troubles us to define the limits between the "classes" of which we hear so much. We also know people poor in "mind, body and estate," who form centers of corruption and iniquity, while others of greater wealth employ their means for the benefit of their fellows. In spite of the misuse of property all about us, we doubt if the world would be benefitted if it changed owners. Property is always changing ownership, but the condition of the world remains about the same. We would also like to know what are the "illegitimate corporations" whose death knell was sounded. Webster tells us that a corporation is a body formed and authorized by law; then how can it be illegitimate, or not according to law, unlawful or unauthorized? We suffer from oppressive laws, and sympathise with those who wish them changed, but it was our votes which put the men in power who made these laws. Let us not make legislators who will give us laws that rob those whom fate has enriched, or raise the poor and needy to positions where they will prove to be the oppressors they often have. Let us have no class legislation.

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VARIATION of domesticated animals and plants in reference to climate and latitude, is a phase of scientific inquiry which is everywhere inadequately studied. This comparative neglect arises from various causes, but it is chiefly due to the fact that few people have sensed its importance, and few possess the power of generalization necessary to its systematic study. The paper in this issue by the Honorable Assistant Secretary of Agriculture is important and suggestive, and it inspires hope of a broader usefulness of the Department of Agriculture. A leading fault with this beneficent institution is the lack of coördination of work among its branches. Of necessity, work must be performed piecemeal; but all work in nature has its relationships to some other work, and its value is enhanced when these correlations are discerned. A broad mind now sweeps the horizon of agricultural science in the hope that some bolder view may be gained. The study of plants in reference to climate fall under three general heads:

1. The study of the distribution of plants over the earth is known as the *geography of plants*. This term appears to have been used by St. Pierre in a somewhat fanciful manner, but Humboldt first gave it form and life. Humboldt held the world in his hands, and discerned and measured the distribution of life. Tournefort has long before discerned the resemblance of successive mountain floras to the floras of successive degrees of latitude, and others had written of the floras of particular regions; but Humboldt encircled the globe with law.

2. The study of the variation of plants as influenced by change of place may be styled the *climatal variation of plants*. This proceeds from the study of the geography of plants, yet is wholly distinct from it. The one considers the subject from the side of geography, studies regions; the other considers it from the side of botany, studies plants. The former may trace the distribution of species, but the latter traces the variation of a particular species or a particular organ. It is necessary to distinguish the two, not only because they are unlike, but because they are commonly confounded.

3. Proceeding from the study of climatal variation is the study of the adaptability to climate, or *acclimation*. It is to the ability of plants to overcome obstacles of climate that we owe much of plant distribution. When we throw man into the foreground as an agent in the adaptation of plants to climate, we study *acclimatization*—the act of man in inuring or habituating a plant to a climate as first injurious to it. The results of acclimatization are marked, and yet close and connected observation is essential to their determination. There are even those who contend that acclimatization does not exist, but they are persons who lack the power of defining phenomena and of analyzing observation. It is no doubt true that in this direction we are to look for the most profound and permanent modification of plants under the hand of the cultivator.

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THE road question comes up again with the warmer weather—one of the oldest and most important of all the questions open to discussion among the tillers of the soil. It has been discussed from the times of the first colonial governors until the present year, has given us good roads and bad ones, and is still most worthy of agitation. One particular point that has often attracted our notice is the liberality in work and time we spend upon the drives on our own places, while neglecting the public roads over which we constantly pass and which are more constantly before our eyes. It is the business of the community to keep the public roads in good order, but the community will not attend to its business properly and we have to suffer. If we work on the roads ourselves the community will benefit by our efforts and give us few thanks; but we must not mind that. Let us be selfish for once and work for our own benefit. We travel over the road leading from our own entrance, and in front of our place, more than anyone else, and to remove the loose stones, drain off the standing water, or fill up a hole, is only a labor of small moment and gives great comfort, besides saving wheels, varnish and profanity. It is too much ever to expect of our own public spirit or selfishness that we will MacAdamize a public thoroughfare; but a little work just at the right time saves much labor in the end. Two of our neighbors in a hilly region have a public road crossing their places under the same conditions, natural and municipal. One keeps his adjoining road well drained by cleaning the gutters, letting the water run into them during the rains. He picks up the loose stones and throws them aside, and altogether with a few hours' labor in the course of the year, has one of the best roads in the village. He does a little work just when it will do the most good. He turns the water into the ditch before it has time to wash gullies in the road. The other man says he cannot afford to work for nothing and leaves the care of the road to the public surveyor, who, in trying to repair a large district with a small appropriation, can do but little to any part of it. And so this man contentedly drives his teams a number of times each day over a rough and unpleasant road, with all its wasteful concomitants. Neither of these men have any appreciation and of æsthetic considerations or an idea beyond what they consider practical utility.

Perhaps beyond either of them is the man who not only is able but willing to work towards improving the road-bed, but to adorn the roadsides with trees and to keep the grass neat, or even to plant shrubs. The decoration of roadsides is a subject on which much might be profitably said, but it must be reserved for other space; but let us think now if it would not be wise for some of us to do a little more to the road adjoining our own place without too much fear of benefitting our neighbors! Can anyone be entirely selfish to real advantage in this world?

A NATIONAL Hall of Horticulture! It sounds well, would be well, is entirely feasible; so why not a hall of horticulture? We will go a step farther. Why not *several* of these national halls of horticulture? Perhaps the latter would be the better plan, in view of the vastness of our country and the consequent difficulty and expense in bringing about well attended meetings. There is enough strength of members and money among the several societies of this country, together with others interested in horticultural pursuits and projects, to successfully inaugurate and carry on several institutions of the kind named. By way of illustration, we will take the states of New York, Pennsylvania and New Jersey. In their confines are the Western New York Horticultural Society, powerful in money, members and individual ability; the New Jersey State Horticultural Society, strong with good officers and working members; the state society of Pennsylvania, wealthy and progressive. Then there are the many local florists, and fruit-growers, societies in each of these states; florists, nurserymen and seedsmen of wealth and ability are also found in each of the states named.

While it is doubtful if any one of these societies are strong enough to carry out such a project, their combined strength would build a hall of horticulture that the country might well be proud of. This same state of affairs exists in nearly all of our United States. In the east, middle east, and middle and northern west, these and the contiguous states are abundantly able to carry out successfully the plan we have suggested to the great honor and benefit of horticulture in all its ramifications. Why not start the movement this summer?

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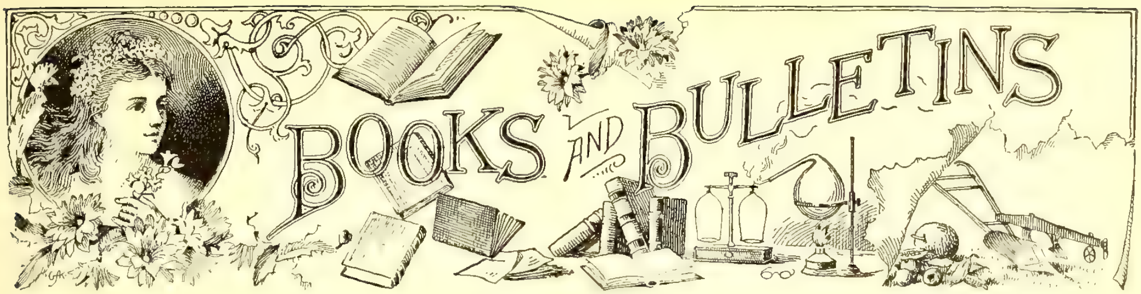
THE TOMATO is rapidly becoming one of the most important of both garden and field crops. Like the potato, it has overcome widespread prejudice, and has gained its position solely upon its merits. It has never been subjected to the disadvantage of having been pushed into favor. So early as 1581 the tomato was grown in Europe, and a hundred years ago it was highly esteemed in many parts of this country. McMahon wrote, in 1806, that in America it was then "much cultivated for its fruit, in soups and sauces, to which it imparts an agreeable acid flavor, and is also stewed and dressed in various ways and very much admired." Yet it was not until about 1830 that it was grown as a market crop in this country. In 1840 Bridgeman knew but two varieties, the Large Squash-shaped and the Cherry-shaped, and seven years later three sorts were grown for market: Large Red, Large Smooth Red and Pear-shaped. Until very recent years it has remained one of the less important garden crops. But the advent of the canning and preserving factories, and the demand for winter fruit, has enormously increased its commercial importance. Mr. Voorhees, of the New Jersey Experiment Station, writes that "it is estimated that the consumption of tomatoes has increased four-fold in the last ten years," and he finds that in New Jersey the crop ranks with wheat in importance, some 15,000 acres being grown yearly to this vegetable.

The tomato is a plant which is exceedingly amenable to treatment, and one which varies widely. In fact, its variableness is its worst fault, and experimentation needs to fix types rather than to multiply them. Although so long cultivated, and everywhere in America easily grown, it is no exaggeration to say that the best methods of culture are probably yet unknown. It is particularly adapted to the climate of America. Here it possesses a productiveness and lusciousness which is almost unknown in most parts of Western Europe, in open-air culture. The experiment stations may do something to enlighten us upon tomato culture. Their literature on the subject to date is as follows:

1882. *Goff*, 1st Rep. N. Y. State Exp. Sta. 139.
1883. *Goff*, 2nd Rep. N. Y. State Exp. Sta. 193.
—— *Green*, 2nd Rep. O. Exp. Sta. 139, 21.
1884. *Goff*, *Arthur*, 3rd Rep. N. Y. State Exp. Sta. 221, 379.
—— *Green*, 3rd Rep. O. Exp. Sta. 146.
1885. *Goff*, 4th Rep. N. Y. State Exp. Sta. 179.
—— *Green*, 4th Rep. G. Exp. Sta. 134.
1886. *Bailey*, Bull. 19, Mich. Exp. Sta.
—— *Goff*, *Arthur*, 5th Rep. N. Y. State Exp. Sta. 172, 261, 289.
—— *Green*, 5th Rep. O. Exp. Sta. 162, 22.
1887. *Bailey*, Bull. 31, Mich. Exp. Sta.
—— *Goff*, *Arthur*, 7th Rep. N. Y. State Exp. Sta. 279, 328.
—— *Green*, 6th Rep. O. Exp. Sta. 231.
1888. *Green*, Bull. 2, O. Exp. Sta.
—— *J. S. Newman*, Bull. 2, Ala. Exp. Sta.
—— *W. H. Newman*, Bull. 2, Ala. Canebrake Exp. Sta.
—— *Keffer*, Bull. 5, Dak. Exp. Sta.
—— *Stubbs*, Bull. 16, La. Exp. Sta.
—— *Cassiday*, 1st Rep. Colo. Exp. Sta. 133.
—— *Popenoe*, 1st Rep. Kans. Exp. Sta. 271.
—— *Goff*, 7th Rep. N. Y. State Exp. Sta. 138.
—— *Butz*, 1888 Rep. Penn. Exp. Sta. 150.
1889. *Smith*, Bull. 6, Nbr. Exp. Sta.
—— *Taft*, Bull. 48, Mich. Exp. Sta.
—— *Clayton*, Bull. 7, Ala. Exp. Sta.
—— *W. H. Newman*, Bull. 6, Ala. Canebrake Exp. Sta.
—— *Bailey*, Bull. 10, Cornell Exp. Sta.
—— *Voorhees*, Bull. 63, N. J. Exp. Sta. 29.
—— *Richman*, 2nd Rep. Ark. Exp. Sta. 100.
—— *Hunn*, 8th Rep. N. Y. State Exp. Sta. 327.
—— *Bishop*, 2nd Rep. Md. Exp. Sta. 26.
—— *Cassiday*, *Watrous*, 2nd Rep. Colo. Exp. Sta. 104, 119.
1890. *Alwood* and *Bowman*, Bull. 4, Va. Exp. Sta.
—— *Taft*, Bull. 57, Mich. Exp. Sta.
—— *Troop*, Bull. 31, Ind. Exp. Sta.



BOOKS AND BULLETINS

Vegetables in Alabama.

Bulletin No. 6, Alabama Experiment Station. The horticultural portions of this bulletin are concerned with tests of various varieties of vegetables and experiments with grapes. The meagre discussions of characteristics of varieties of vegetables are presented in tables, without summaries, and little can be got from them. Tests were made with varieties of potatoes, peas, radishes, tomatoes, cabbages and muskmelons. Fertilizer tests were made upon potatoes, and several varieties were compared as to keeping qualities.

Winter-grown Cabbage Plants.

Several sorts of cabbages were sown October 11, and allowed to remain during the winter. "One row of each variety was protected by inclining a foot plank on the north side, the rows running east and west. There was a marked difference in those protected in this manner ; the plants being about three times larger than the unprotected in all the varieties except the Large Late Drumhead and the Bloomsdale Large Late Flat Dutch, which were about five times as large as those not protected. Only about twenty per cent. of the Drumhead Savoy, Landreth's Early Summer and Green Curled Savoy, unprotected, survived the winter. For the first month, the protected continued to grow and remained larger than the unprotected ; but after that the unprotected ones grew rapidly, until finally no difference could be seen. Protecting them did not cause them to head any earlier. Bloomsdale, Large Late Flat Dutch and Large Late Drumhead produced fine heads, and nearly all of them headed."

Grapes in Alabama.

The vineyard, to which reference has been made in former abstracts, continues to do well. "From this year's experiment we draw the following conclusions, so far as they can be drawn from results of one year: 1. That the grape grows and fruits well on 'red prairie land.' 2. That the varieties of black grapes rot less than the white. 3. That sacking the white grapes (except Niagara) and Delaware (red) does not pay. 4. That the Concord, Ives, Norton's Va., Niagara and Hartford will pay for planting in the prairie for table use, and are benefited by being sacked."

How Grapes Grow.

☐ How Crops Grow. *A Treatise on the Chemical Composition, Structure and Life of the Plant, for Students of Agriculture, with Numerous Illustrations and Tables of Analyses. Second Edition. By Samuel W. Johnson, M. A. Pp. 416. Orange Judd Co., N. Y.* Twenty years have passed since Professor Johnson first gave students of agriculture his inimitable and invaluable works, "How Crops Grow" and "How Crops Feed." These works have been more helpful to the study of agriculture in its chemical aspects than all other American works combined. It is with great pleasure, therefore, that we take up a new edition of the older work, for progress has been rapid during the intervening years. This new book is, in the best sense, a revision. It is not an extension. It adheres strictly to the original plan, and therefore possesses all the merits of conciseness and perspicuity which characterize the first edition. The new volume is larger than the old by only about twenty pages, yet there is more than this amount of new matter, as some seventeen pages have been saved by reducing the tabular matter in the appendix and the prefatory matter has been shortened.

The most conspicuous additions and extensions in this edition are the discussions upon carbohydrates, albuminoids, alkaloids, amides, the functions in the plant of potassium, magnesium and calcium, and seed variation and selection. In the original volume, the discussion of ferments was confined to the action of diastose in germination, but in the later one it is considered in a larger sense in connection with the albuminoids. In short, the volume presents an epitome of the present knowledge of how crops grow, without presenting a burden of details.

Steam vs. Hot Water.

Bulletin No. 8, Massachusetts Hatch Experiment Station. *Experiments in Greenhouse Heating. Some Observations on Peach Yellows. S. T. Maynard.* Professor Maynard is the first experiment station officer to make careful tests of the relative efficiency of steam and hot water in heating greenhouses. His tests of last winter indicate that hot water is more economical and gives more uniform results with the heaters which he used. The tests have been repeated during the last winter with similar results. During a certain period, 6,598 lbs. of coal were used for the hot water heater and the average daily temperature was 49.74°. During the same time, the steam plant, heating a similar area, used 9,784 lbs. of coal and maintained a temperature of 48.39°. It will probably be found eventually that a combined steam and hot water plant will be most satisfactory for many kinds of houses These experiments certainly show a superiority in hot water heating.

"Some Observations on Peach Yellows" are also presented in this bulletin. These observations possess unusual interest from the fact that so early as 1875 Professor Goessmann began experiments at the Massachusetts college upon yellows, and Professor Penhallow soon after

Maynard on Peach Yellows.

made studies there in the same direction. These early investigations gave rise to a very general impression that the trees under experiment were not afflicted with the true yellows. Professor Maynard, "having the above trees under his care then and up to the present time, and having made a careful study of the peach for nearly twenty years, can say positively that many of the trees were badly diseased with the yellows, notwithstanding the statement by parties not conversant with the facts that it was doubtful if the true yellows had made its appearance in this section at that time. Many visitors familiar with the disease also pronounced it the typical yellows." The doubts concerning the affliction of these trees did not arise from any feeling that the experiments were ill-advised, but wholly from the fact that the descriptions of the disease in the College orchard did not seem to identify the disease as it exists in the great peach regions. Professor Penhallow's characterization of the disease before the Massachusetts Horticultural Society in 1882, was wholly inadequate to a diagnosis. The characterization is condensed as follows: "We first of all observe a sickly yellow color in the leaves, which, later, generally extends to the branches, and thus gives to the entire tree the yellow color, on account of which the disease was very appropriately given the name it now bears. The fruit ripens prematurely (from two to four weeks before its season), often becomes abnormally velvety, possesses a high, unnatural color, which is usually likened to the hectic flush of a consumptive person, and has an insipid, unnatural flavor." Whatever may have been the ailment of the trees, this description is not characteristic of the yellows.

Neither is Professor Maynard's characterization diagnostic. It is as follows: "1. A sickly yellowish-green color of the foliage. 2. Small leaves, often clustered and tinged with red, with a small amount of chlorophyll in the cells. 3. The new shoots are small and wiry, and grow in clusters or tufts, especially if they come out on the trunks or main branches. 4. The fruit ripens prematurely, is small and of a high color, and insipid or bitter to the taste. Trees may present the yellow, sickly appearance from want of food or from injury, but if the fine wiry shoots, the prematurely ripened, high colored and bitter fruit are present, the trees have the "yellows." The first symptom certainly conveys the idea that the first indication of yellows is a general yellowing of the whole foliage. As a matter of fact, this yellowness is usually a late symptom, and it rarely happens that the disease at once affects the foliage of the whole tree. The disease is usually first apparent in one or two portions of a tree, often in only a single fruit. The small leaves, "clustered and tinged with red" indicate general debility rather than yellows. The third symptom usually designates yellows, but the description of the "new shoots" is not full enough to be satisfactory. The tendency of these adventitious shoots—if such shoots are meant—to branch the first year is one of the crucial tests of the disease. Premature fruit, "small and of a high color," is by no means characteristic of yellows. Many conditions may give such fruits. The diagnostic point in this connection is the presence of definite red spots or blotches upon the fruit, and these blotches extend into the flesh, and usually to the pit. These spots are conspicuous and characteristic, and they constitute the most important symptom for the determination of the disease. It is unusual, also, that yellows fruit is bitter until the disease is far progressed. But bitter fruits are often found upon debilitated trees.

We do not mention these points for the purpose of discrediting Professor Maynard's observations, but simply to show that more complete diagnoses must be made before peach growers can feel assured of results. The trees may have the yellows, but the description does not prove it. Professor Penhallow's description of the disease at Houghton Farm is no more characteristic, yet the trees must have had the yellows, for a visit to the Farm last summer revealed the fact that very few of the trees upon the place are alive, and these are in the last stages of true yellows.

Professor Maynard thinks that "the causes which are productive" of yellows are the following: insufficient food supply; too much nitrogenous manure applied late in the season; injury by cold; injury by borers; injuries by accident. It is even supposed that the breaking of the tissues or structure of the tree by frosts "in such manner that they cannot be repaired during the next season's growth," and which causes "dead places often on the trunk and main branches," may be productive of the disease. It is singular that so many of these old and loose notions should still be held to account for the disease, even indirectly. The experience of growers upon the new and fertile soils of the west proves beyond all cavil that trees upon the best soils and receiving the best of care, both in youth and age, in all seasons, in all treatments, are liable to the attack of yellows.

Professor Maynard has done a service in giving the behavior of trees in the college orchards, although we wish that the statements and discussions had been fuller. The observations suggest the old question in a new form, Does peach yellows behave differently in Massachusetts than in the large peach growing sections of the country? It is not impossible that it may do so, and such records as this may bring out the facts. It is certain that the following observations will not apply to all parts of the country: "In the college orchard of some nine hundred trees, careful examination of all the trees was made during the past season. Of these, about fifty in different parts of the orchard gave unmistakable evidence of the 'yellows,' and in every case the trunks or main branches were found to be injured from 10 to 60 per cent. In no case could we find any indications of the disease where the branches or trunk were not injured in some way. The same disease, apparently, although we have made no careful study of the tissues, often destroys the wild cherry, the wild plum, the sweet birch *(Betula lenta)* and other trees."

The following conclusion is drawn: "While we do not know the exact nature of the disease called the 'yellows' and cannot wholly control the atmospheric causes, the other causes we can largely control, and by careful cultivation in the spring and early summer only, by the use of complete fertilizers in the fall or early in the spring we can largely prevent this destructive disease. It may not be profitable to try to save diseased trees, and it would be advisable to destroy them as a matter of safety, although we have no evidence that the disease is contagious; for upon the college grounds more or less diseased trees may be found at all times, and young trees are planted where old ones have died, and with an abundance of plant food, have grown in perfect health for six years."

Cranberry Gall-Fungus.

BULLETIN NO. 64, NEW JERSEY EXPERIMENT STATION. *Some Fung[o]us Diseases of the Cranberry. By B. D. Halsted. Pp. 40. Illustrated.* This is the first experiment station bulletin to treat of the cranberry. It considers two diseases, one of which is new. The cranberry gall-fungus is the name which Dr. Halsted gives to a new disease which is sometimes locally known as "red rust." So far as known it occurs only in parts of a single cranberry bog near Brown's Mill, Burlington Co., N. J. The disease was first observed in 1886. "The next season it was quite generally spread over a half of the bog; in 1888 it was still more abundant, and ruined the crop upon the attacked areas. * * * The galls, since their discovery three years ago, have made their appearance with much promptness about the first of May." These galls are minute, and appear upon the leaves, flowers and stems. "To the naked eye the galls are small protuberances, but as they are usually in considerable numbers on the same part, the infested portion is misshapen, often dwarfed, and of a red appearance." The disease is caused by a fungus known as *Synchytrium Vaccinii.* It occurs on huckleberries, laurels, wintergreens and other plants bordering the bog. Definite remedies cannot yet be advised, but the following is suggested: "Withholding the water from the bog during the winter and spring may subdue the fungus, but it would probably be a quicker and even cheaper way to burn the infested plants, and this includes the shrubs along the border and elsewhere that are attacked."

Cranberry Scald.

The obscure and vicious cranberry scald or rot is also due to a fungus. This disease attacks the fruits early in the season, first as a "scald," but later causing decay. It is estimated that one-third of the New Jersey crop last year was ruined by this disease. Dr. Halsted presents opinions from 67 cranberry growers in various states. His studies have not yet led to remedies. "Sanding the bog, and controlling the water so that it will be low in midsummer, have usually been a benefit to scalded bogs."

Potatoes in Ohio.

BULLETIN NO. 1, VOL. III, OHIO EXPERIMENT STATION. *Experiments with Potatoes. By W. J. Green. Pp. 14.* Many trials of potatoes during two years, both at the station and in other parts of the state, give the following results: "The most productive of the early varieties are Oxford, Puritan Early and Crown Jewel. Next in order stand Nott and Lee Favorite. Of the medium and late sorts, Empire State, Summit, Seneca Beauty, White Elephant and Delaware rank the highest of those that are fully tested. Including early, medium and late varieties, not fully tested, those that are the most promising are Queen (New Queen), Rural New-Yorker, Superior (Burpee's Superior) and Minnesota Early. Early Ohio, Ohio Junior and Stray Beauty rank as the earliest, but are unproductive. Albino and Chas. Downing seem to be less reliable than formerly, probably owing to susceptibility to blight. Northern Spy and Monroe Prize are inferior in appearance, hence not valuable for market. The former is unproductive, and it is not probable that the latter will rank very high in this respect. Oxford, Seneca Beauty and Delaware show comparatively little variation on different kinds of soil."

Fertilizers for Potatoes.

Seven systems of fertilizing were compared in a field of three acres, laid off into plots of one-twentieth acre. The tests have been continued two seasons. The land was considerably worn, and blight injured the crop both years. "There is more in the results to teach what not to do than otherwise," but several important conclusions are drawn. The superphosphates, acid phosphate and Thomas' Slag "have in nearly all cases increased the yield." Stable manure tends to produce scab. Yields are not increased by any fertilizer on soil "already in a high state of fertility. "The most feasible" method is to bring the soil up to the proper condition by enriching the land for previous crops." Sulphate of potash, nitrate of soda and sulphate of ammonia do not appear to be profitable fertilizers for the potato.

Green on Cutting Potatoes.

Mr. Green makes the following conclusions of several years of experiment with different methods of cutting potatoes: "1. Other conditions being the same, the larger the cutting the greater the total product; i. e., the total product varies in about the same ratio as the size of the cutting. 2. The marketable product also increases as the size of the cutting is increased, but does not follow the same ratio as the total product, the rate of gain being less. 3. The increase is found in both the large and small potatoes, the greater portion being in the latter. 4. A crop grown from whole potatoes matures at an earlier date than from small cuttings. 5. Small cuttings require soil that is more highly enriched and thoroughly prepared than large cuttings and whole potatoes, in order to secure a good stand and to produce a profitable crop. 6. The question of relative profit, as between the use of small cuttings and whole potatoes, depends upon the cost of seed potatoes, the date at which the crop is to be harvested and sold, and the condition of the soil at planting time. 7. In ordinary practice it will usually be found that neither extreme as to quantity of seed used will be found to be profitable. The safest plan is to use large, well matured, healthy potatoes, and cut to two and three eyes."

Goff on Cutting Potatoes.

Bulletin No. 22, Wisconsin Experiment Station. A portion of this bulletin is devoted to potato experiments by Professor Goff. In tests of methods of cutting potatoes, it was found that "the total yield was directly in proportion to the bulk of seed planted. But in merchantable yield, the two-eye cuttings slightly surpassed the halves and whole tubers." As a whole, the experiments "favor heavy rather than light seeding. Cutting off the 'seed end' was found detrimental to the yield."

Potatoes in Wisconsin.

"Of 122 varieties and seedlings of the potato tested the past season, the following ten were most productive, yielding in the order named: Seedling from C. E. Angell, Rose Beauty, Monarch, Duplex, Late Beauty of Hebron, Mullaly, Alexander's Prolific, Seneca Red Jacket, White Beauty of Hebron and Wisconsin Beauty. Placed in the order of their table quality, these varieties would rank as follows: Alexander's Prolific, White Beauty of Hebron, Late Beauty of Hebron, Duplex, Monarch, Wisconsin Beauty, Seneca Red Jacket, Rose Beauty, Mullaly, seedling from C. E. Angell."

Kinney on Cutting Potatoes.

Bulletin No. 5, Rhode Island Experiment Station. The larger part of this bulletin considers "methods of planting and tests of varieties" of potatoes, by L. F. Kinney. "This season, two-eye pieces planted 18 inches apart has given the best results; the average yield by this method being more than eleven per cent. greater than when single eye pieces were planted 9 inches apart, and nearly twenty-eight per cent. greater than when whole potatoes were planted 36 inches apart. The average proportion of small potatoes was, however, this season, largest with two eyes, and slightly less with single eyes than with whole tubers. As a rule, the heaviest potatoes grew where whole potatoes were planted."

Potatoes and Latitude.

One hundred varieties of potatoes were from Connecticut (lat. 41°), and fourteen were from Wisconsin (lat. 44°). The average yield was greater from the Wisconsin seed, but the results were such that "no deductions of value can be safely made." A test of the influence of latitude should consider that longitude is often an important factor in plant variation, as climatic conditions do not follow degrees of latitude. Seed should be selected so far as possible from similar longitudes for such comparisons.

Home-Grown vs. Purchased Seeds.

Bulletin No. 10, Pennsylvania Experiment Station. Professor Butz asks, "Should farmers raise their own vegetable seeds?" and answers the question in the negative. "The question in its scientific aspect presents itself in the following form: Are seeds which have matured under high cultivation (as on our best seed farms) better for our less enriched farm soils than seeds which have matured on this poorer soil? The answer must be found in a comparison of results regarding earliness, productiveness, vigor and quality of the products. The conditions at the station were very favorable to the work, and last year seeds were gathered from the best of those vegetables that seeded. The ground in which they grew is not a rich garden soil, but only an ordinary farm soil. These seeds were planted this year along with seeds of the same varieties from the seed houses of Landreth, Dreer, Thorburn and others." The results are as follows, the plants tested being numerous varieties of beans, lettuce, peas, radishes and tomatoes: "In the majority of cases the earlier marketable products were obtained from the purchased seeds. The greater yield, with but few exceptions, was obtained from purchased seeds. Lettuce from purchased seed produced heads that did not "shoot up" to flower as early as the plants from station seed. Radishes from purchased seeds were larger, more tender and more uniform than those from station seeds. On the whole, the results are strongly in favor of seeds from good soil, however rich that may be."

This is an interesting experiment, and one which needed to be made. The results are undoubtedly correct for "farmers," if that term is used in its ordinary sense, to designate those who practice a rather large and mixed husbandry. For market gardeners who grow particular crops, the results may sometimes be different, particularly in cauliflowers, cabbages and onions. Professor Butz has made a good point.

The bulletin also gives descriptive notes upon various vegetables, but no summaries of adaptation are drawn.

Goff on Apple-Scab.

Bulletin No. 23, Wisconsin Experiment Station. *Prevention of Apple-Scab. By E. S. Goff. Pp. 11. Illustrated.* Professor Goff, working under direction of B. F. Galloway of the Department of Agriculture, has had phenomenal scccess in the treatment of the apple-scab. The Fameuse, which scabs badly in the west, was selected for the experiment. The trees were sprayed seven times, at intervals from the last of May to the 10th of August. The materials used were potassium sulphide, soda hyposulphite, a sulphur and lime compound, and a carbonate of copper solution. "All of the treatments were more or less beneficial, and the carbonate of copper solution was almost a complete remedy for the disease." Trees not treated gave of first quality apples 23.34 per cent., of second quality 53.89 per cent., and of third quality 22.71 per cent. Those treated with carbonate of copper gave of first quality 75.02 per cent., of second quality 23.35 per cent., and of third quality 1.63 per cent. "The reduced size of the badly scabbed fruits, which does not appear in the numerical computation, also created a manifest difference in favor of the spraying."

"Formula for the Fungicide.—The experience of the past season would lead us to recommend using, as a convenient formula, a solution composed of one ounce of carbonate of copper dissolved in one quart of aqua-

Formula for Apple Scab Remedy.

ammonia (strength 22 Baumé), diluted with 100 quarts of water. One and one-half gallons of the diluted solution are sufficient to thoroughly spray a tree of medium size, and two gallons for one of large size. It follows, therefore, that four ounces of carbonate of copper and one gallon of ammonia will make 100 gallons of the diluted solution, which is sufficient to spray 50 large or about 75 medium trees once."

"HOW TO MAKE AND APPLY THE FUNGICIDE. The ammonia should be procured in a glass or earthern vessel, and be kept tightly corked with a rnbber stopper. To this add the precipitated carbonate of copper at the rate of one ounce to one quart of ammonia, in which it dissolves, forming a very clear, deep blue liquid. When ready to commence the application, add this solution to the water used for spraying, at the rate of one quart to twenty-five gallons of water. The bottle containing the solution should be kept tightly corked, otherwise the ammonia will waste by evaporation. The number of applications it is necessary to make to secure the greatest benefit is yet to be determined. The adhesive power of the carbonate of copper is very great, and it is possible that a smaller number of treatments than the seven made in our experiment would have answered as well. I would recommend at least three or four treatments, and it is probable that one application, made just after the leaves expand and before the flowers have opened, would add to the efficiency of the treatment, as the fungus commences its growth quite early in the season."

Taft on Apple-Scab.

BULLETIN NO. 59, MICHIGAN EXPERIMENT STATION. *Fruit List and Apple-Scab. By L. R. Taft. Pp. 42. Illustrated.* Professor Taft, for Mr. Galloway, applied essentially the same remedies as Professor Goff, with the addition of a modified eau celeste. The eau celeste gave the best results and the carbonate of copper next best. Trees untreated gave 12.5 per cent. perfect fruits, 85.7 per cent. slightly scabby, and 1.8 per cent. badly scabby. Carbonate of copper gave 51.2 per cent. perfect fruits, 48.6 per cent. slightly scabby, and .16 per cent. badly scabby. Modified eau celeste gave 68.8 per cent. perfect fruits, 31 per cent. slightly scabby, and .2 badly scabby. The Northern Spy was the variety treated, and the applications were made seven times. The carbonate of copper injured the surface of the fruit very slightly, giving it "a russet color in streaks; whether it injured the appearance of the fruit might be questioned. From the experience of this year, we are convinced that with many varieties, in localities where scab prevails, either of the copper mixtures will add from 25 to 50 per cent. to the value of the crop, at a cost not exceeding 25 or 30 cents for an average sized tree. This estimate will cover the cost of the chemicals and of their application, and if the season is a warm, dry one, and the chemicals are purchased at wholesale, it can be reduced one-half." Dissolve 2 pounds of copper sulphate in hot water, and in another vessel dissolve 2½ pounds carbonate of soda. Mix, and before using add 1½ pints of ammonia, and then dilute to 22 gallons. Professor Taft considers 30 or 32 gallons of water better than 22.

Formula for Modified Eeu Celeste.

Michigan Fruit Lists.

This bulletin gives extended lists of fruits adapted to various portions of Michican, founded upon the admirable fruit lists of the State Horticultural Society. These lists of the State Society are models, and may well be studied by other societies.

Sweet Corn in Illinois.

BULLETIN NO. 8, ILLINOIS EXPERIMENT STATION. This record is devoted to experiments with corn. Professor Burrill contributes some observations upon varieties of sweet corn, and makes the following conclusion: "Among so many varieties it would be presumptious to name any one as the best. But for general planting any of the following varieties, mentioned in the order of earliness, may be recommended: Early—Cory, Narragansett, Ford's Early, Minnesota, Leet's Early. Medium—Crosby, Concord, Stabler's Early, Landreth Sugar, Black Mexican. Late—Amber Cream, Ruby, Stowell's Evergreen, Eight-rowed, Triumph, Egyptian, Late Mammoth. The early, small growing varieties do best planted, if in hills, 1½ to 2 feet apart; the medium 2½ feet apart; and the large, late varieties 3 to 3½ feet apart."

Peach Notes.

BULLETIN NO. 11, ALABAMA EXPERIMENT STATION. *Peaches and Plums. By J. S. Newman, Pp. 13.* It is commonly asserted that seedling peaches possess greater hardihood and are surer bearers than budded trees. Mr. Newman has experimented for five years upon these points and finds them to be unfounded. He also finds that "there is no uniform relation between the date of flowering and season of ripening." "During the unfavorable seasons of 1887 and 1888 the only varieties which bore fruit were either late bloomers or those which had very large petals."

Varieties of Peaches for Alabama.

"FOR SHIPPING.—Alexander, Thurber, Chinese Free, Crawford's Early, Chinese Cling, Elberta, Crawford's Late, Jackson, Lee, and Stump the World.

"FOR CANNING.—Bernard, Chinese Free, Columbia, Crawford's Early, Elberta, Crawford's Late, Deming's Sept, Duff's Yellow, Duggar's Golden, Foster, Lemon Cling, Mixon's White, Stump the World, Chinese Cling, Jackson and Lee.

"FOR FAMILY USE.—Alexander, Bernard, Chinese Cling, Chinese Free, Columbia, Crawford's Early, Duff's Yellow, Duggar's Golden, Eatan's Golden, Elberta, Foster, General Lee, Stonewall Jackson, Hale's Early, Lady Parham, Lemon Cling, Mixon's White, Rivers, Royal George, Stump the World, Tillotson, Bustion's Ootober."

BULLETIN NO. 8, NEVADA EXPERIMENT STATION. *The Codlin Moth. By F. H. Hillman. Pp. 8. Illustrated.* This comprises a general essay upon the codlin moth, with recommendations for its destruction. Efforts have been made to determine how long the pest has been known in the state and how widely it is distributed.

Codlin Moth in Nevada.

"Many localities seem to be free from the moth, while in other parts from 50 per cent. to 75 per cent., and in one case 90 per cent. of the fruit is reported injured this year. The longest period of injury given is eight years; the average period is but two and one-half years. It is a noticeable fact that 63 per cent. of the orchards suffering the greatest injury has been affected *only one year.* This gives us some idea of the rapid increase of this pest in localities where it has gained a foothold. This should be evidence sufficient to show that these localities and finally the fruit section of the entire state will be overrun by this destructive enemy if its progress is not checked. It is found that the injury thus far is confined mainly to the counties of Ormsby, Washoe, Elko and Douglas. According to the answers received, over 30 per cent. of the apples of these counties are injured this year. It is generally acknowledged that the apples raised in Nevada are of the first quality. When it becomes generally known that this fruit can be profitably raised in this state, it is more than probable that there will be a great increase in the extent of our apple culture."

Native Plums.

Notes are made upon varieties of native plums. "All of these varieties, except Brill and Hendricks, should be picked when they commence coloring, and ripened in the house if for family consumption, or packed, if for market, as soon as gathered. They ripen en route, acquiring a brilliant color and better flavor than when ripened on the tree. The plum is one of the most profitable fruits for shipping to northern markets. The Wild Goose has brought from $6.00 to $10.00 per bushel in the New York market for the last ten years."

"The Hattie and Marianna grow readily from cuttings and are being used as stocks for peaches. They seem to be less subject to attack by the peach borer than either the peach or other varieties of plums. The Missouri and Cumberland, on account of late flowering, escaped frost in 1887 and 1888 when the fruit on all other varieties was killed." L. H. B.

Thirteenth Report on Injurious Insects, 1889. *By Eleanor A. Ormerod, Consulting Entomologist of the Royal Agricultural Society of England.* The first article of this valuable report brings to light another plant attacked by the nematode worms to which attention was called in the April American Garden. A disease which has appeared in many parts of England, and commonly called clover stem sickness is found to be caused by one of these minute destroyers—*Tylenchus devastatrix.* They work upon the inside of the stem, dwarfing and blasting the plant. This stem eelworm as the author calls it, infests many kinds of crop and weed plants, and can pass from one to the other; consequently *rotation of crops* is one point to be considered in the matter of prevention. Some of the field crops most subject to attack are oats, rye, clover, teasels and buckwheat; onions are also very liable to it, and there is also a potato-sickness caused by *Tylenchus devastatrix.* This new form of attack was observed by Dr. Kuhn in Germany, and also by Dr. Ritzema Bos in 1889; and as a threadworm or nematode attack has appeared in potatoes in the United States, it is probable that this same eelworm is causing it."

Clover Stem Sickness.

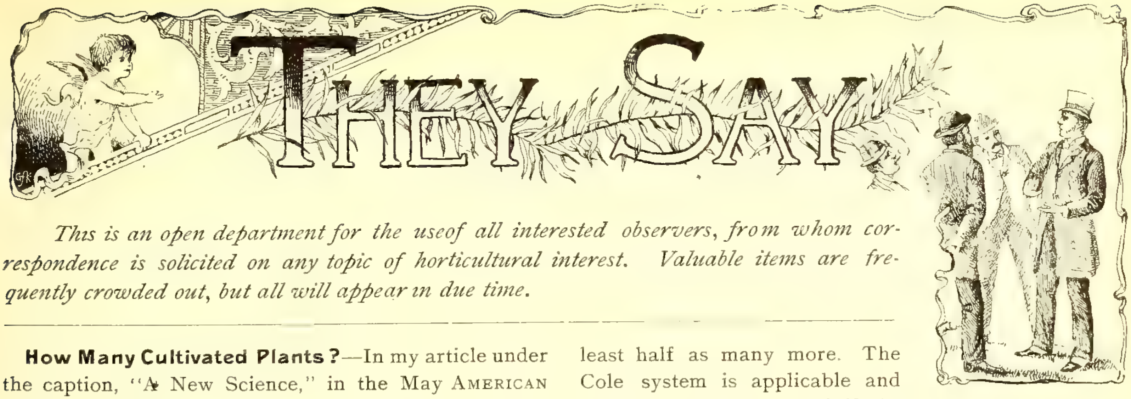
"It is highly desirable, when there has been stem eelworm attack to take as the next crop something that is not known to suffer from it. * * * Infested earth may carry the eelworm from one place to another. * * One measure of prevention is deep plowing, or in smaller areas trenching, such as will turn a fresh clean uninfested surface to the top; and as a remedy when attack is even seriously present, a dressing chiefly or entirely composed of sulphate of potash and sulphate of ammonia, at the rate of 3½ to 4 cwt. to the acre has been found to answer."

Currant Insects.

Miss Ormerod illustrates and describes two currant insects, to which fortunately Americans are yet strangers. The first is a disease known as "bud-gall" caused by a naite, closely related to those which cause such curious malformations of maple leaves in this country. The second is the white woolly currant scale—an insect very similar to the cottony cushion scale of our maples.

Fruit Tree Pests.

A number of insects affecting fruit are discussed. The American reader is struck with the inconvenience of many of the remedies proposed as compared with our modern process of spraying with arsenites. As noted in a recent American Garden this process encounters a very strong prejudice in England, but Miss Armerod is earnestly striving to introduce the practice there, and in the present report adduces much evidence from our experience in its favor. It is to be hoped that our conservative cousins will profit by it. C. M. W.



This is an open department for the use of all interested observers, from whom correspondence is solicited on any topic of horticultural interest. Valuable items are frequently crowded out, but all will appear in due time.

How Many Cultivated Plants?—In my article under the caption, "A New Science," in the May AMERICAN GARDEN, I said that "there are only about 250 species of plants cultivated for food among civilized peoples." This is De Candolle's estimate, and it may be supposed to include all the important species. It is well known, however, that over four times this number of plants are cultivated for food in one form or another in all parts of the world. Dr. Sturtevant's notes (*Agricultural Science*, 1889, 174) record 1,070 species of "cultivated food plants." But even this number is less than one per cent. of known species of plants, and it does not in the least invalidate my argument.—L. H. BAILEY.

California a Big State.—Few persons have an idea of the area of California. It is the second in size of the states of the Union, Texas only being larger. To give those who have not looked the matter up a lucid idea of its size, the following table has been prepared, giving the area in square miles, and the population in 1880, of ten states that could be comfortably located within the bounds of California and then leave 470 square miles of California's territory unoccupied for them to waltz around in:

STATE.	LAND SURFACE. *Square miles.*	POPULATION. *Census of 1880.*
Maine	26,750	648,946
New Hampshire	8,705	346,991
Vermont	8,705	332,286
Massachusetts	7,765	1,783,085
Rhode Island	920	276,531
Connecticut	4,700	622,700
New Jersey	7,095	1,131,116
New York	46,070	5,082,871
Delaware	1,960	146,608
Ohio	40,460	3,198,062
Total	153,130	13,569,186
CALIFORNIA	153,600	864,694

The water surface of the ten states mentioned is 6,670 square miles; that of California is 2,380 square miles. Estimated population of California at present, 1,600,000. It is considered that California can safely carry a greater population to the square mile than any state in the Union when her whole area needing it is under irrigation. That is, she could carry safely within her own borders, and feed and clothe them with every crop grown in temperate and semi-tropical climates, 50,000,000 people, or nearly as many inhabitants as there are to-day in the whole territory of the United States. And with the *new agriculture*, or a system of sub-irrigation and underdrainage combined, something like the system invented by the late A. N. Cole, of Wellsville, N. Y., and there tested practically by him, California could support at least half as many more. The Cole system is applicable and useful everywhere. And if the practical experiments at the farm on the hill-side are a safe guide for what may be expected of the system, it would make crops nearly absolutely sure every year, double to quadruple the product, and cause the poorest soil to produce nearly equal with the richest; make arid regions with great summer heat the most productive in the world, and make irrigation safe so far as health is concerned. For it must be admitted that surface irrigation breeds malaria in all hot climates, and eventually ruins the soil in arid climates from the constant accumulation of alkali. What is the future of agriculture, horticulture and all the other "cults" with the new agriculture? With it, are thirsty Nevada and hot and arid Arizona going to outstrip Illinois and Iowa in wealth, population and products? It looks that way, sure. The climate and soil of their great "mesas," valleys and mountain sides are right glorious; all they need is the temperance drink, stored up where the plants and trees can reach it. The new system would give them always enough, never too much, just what they need every hour in the year.—D. B. WIER, *California*.

Horticultural Specimens.—M. Buysman, of Middleburg, Holland, the well-known collector and grower of botanical specimens of useful plants, writes as follows concerning his business: "The plants of this publication I mostly cultivate myself, excluding the tropical species, but now my garden has got too small, and I am obliged to look out for another larger one; as I have not the means to do so I have directed myself to many persons in Holland and got the promise of assistance, *on condition, however that I should get the wanting part of the sum necessary elsewhere.* Many societies have also promised to collect for me contributions."

Snow in California.—"I read that you have snows in northern California this winter two to sixty feet deep. How is this? I have always understood that there is little difference between the winter temperature, of northern and southern California, and that snow seldom fell." So writes a correspondent; she had been rightly informed as to California's winter temperature north, for there it is only two degrees colder, in the extreme, at Redding, away north in Shasta county, than at Riverside, away south in San Bernardino county; and the same is true throughout the state in all the valley and foothill regions. The snows, deep snows, are in the high mountains above 6,000 feet, and there would be exactly as great a depth of snow on the high mountains of the south part of the state as north, if the rainfall south was the same. The extremes of winter cold are nearly exactly the same at Riverside as they are in the great interior valleys of the northern and central portions of the state, and greater than they are here in the valleys of the coast region; yet the mean (average) is a little lower here and north, because in the interior and drier south they have more bright days when the sun gets in his work. Everywhere in the foot-hills, 200 to 1,000 feet above the floors of the valleys, it is warmer than in the low valleys, and the extremes and fluctuations are not so great. *On* these hills, not in or between them, in the narrow valleys, are the healthiest homes to be found on this continent, for man, beast, or plant; yet but very few homes are now seen on the hills, for the reason that it is generally expensive to bring water to such homes. Snow has not actually fallen here in Petaluma this winter, though it has been colder than the average. We did have snow, hail and rain mixed, enough one day to whiten the ground for a short time, yet there were many days when the snow reached down the mountain sides within 600 feet of the valley floor. Sonoma mountain, seven miles (its summit) to the east of us, is 2,400 feet high, while Mt. St. Helena, 35 miles away, had her snow-white cape on nearly all winter, at times robed in a bridal dress of spotless white. The old lady is nearly 6,000 feet tall. But when we come to climb the great Sierras, with a precipitation of 80 to 120 inches of water, such winters as this last one mostly in the form of "the beautiful," there is at times rather too much snow for comfort in traveling, especially railroading. One fellow reported the depth of the snow up there as being 60 feet over the tops of the telegraph poles, and snowing fast at the time! It is a queer country; a man can grow as fine oranges as ever grew, and from the center of his orange grove see great banks of snow every day in the year, when the thermometer at his side is showing 115° of heat!—D. B. WIER, *Petaluma, California.*

The Harvard Summer School of Botany, a well known teacher's course, is to be conducted by Mr. W. F. Ganong, and will open June 15. A summer class in cryptogamic botany will be conducted by Mr. A. B. Seymour, who will give *special attention* to "agricultural botanists."

Horticultural Education.—The future of the country depends upon the proper education of the children, and if this society can do anything to get the children interested in the cultivation of fruits or flowers or vegetables, it should do so. We are soon to leave our places here, and if the society is to prosper we must take action to interest children in horticulture, so that they may take our places when we are gone, and do better than we have done. There are many difficulties in the way, when we attempt to make our ideas practical, but still we can do something. In Hingham, where the speaker resides, the agricultural societies have a children's department, which strengthens the society and improves the children. Working on these lines, offering premiums for the best fruits, flowers and vegetables grown by children, will be a step in the right direction. Another step suggested is that since this society is affiliated with the State Board of agriculture, and whatever the board requires societies to do they must do, there being seven members of the board who are also members of the society, can they not influence the board to do something in this direction? The board might require the societies to offer prizes for the best herbariums of ferns and grasses collected by children, and thus educate them to observe better than ever before. Another point is that we now have a series of lectures every winter, which are listened to mostly by gray-headed persons; might we not have one lecture especially adapted to the older children in the high school? In Hingham notice is sent to the teachers of whatever is done by the agricultural society which will be for the benefit of children, and the result has been for the advantage of both the society and the children The same course was pursued at a recent farmers' institute at Topsfield, with promising results. The society should look into this matter carefully, and wherever it sees an opportunity to elevate the education of children it should improve it. It has already done much in shaping opinion in regard to the cultivation of flowers, especially in New England, perhaps more than we realize. That flowers are cultivated as much as they are from northern Maine to the southern boundery of Connecticut is largely due to the influence of this society. Whatever we can do to improve the cultivation of fruits, flowers and vegetables, especially among children, let us try to do it.—*Edmund Hersey before Massachusetts Horticultural Society.*

Plantswomen.—I have lately received a rose-list from the "Fruitvale Rose Company of East Oakland." This "company" consists of the Misses Pratt, who have bought a very fine tract and are devoting their whole attention to roses, new and old, especially to "roses grown on their own roots." Another plant catalogue comes to me from Mrs. Theodosia B. Shepherd, of Ventura. This lady has a superb plant of *Cereus triangularis* that has now reached the roof of the house, thirty-five feet from the ground, and extends nearl across the whole front. It is said to be the largest specimen of the species in the United States.—CHARLES H. SHINN.

Thinning out the Sparrows.—It is already too late to think of ever destroying the sparrow. We can only palliate by thinning the flocks; the legislature of New York has repealed the law protecting them, but this is not enough. Owing to their phenomenal fecundity, the state should give a bounty of one cent a head, and then our boys would attend to them. I once drew and sent to Albany a bill that passed the house, but failed in the senate, from fear that the cost would be too great. The amount of bounty in the original bill as I drew it, was one cent per head, but through some influence the bounty was doubled, and the measure thus defeated. It was provided that one hundred scalps must be accumulated before payment could be demanded of the state. This provision was made to prevent the measure costing the state any great amount of money, for the reason that few boys would accumulate so many birds; but it would nevertheless set them at work, and call attention to the necessity of thinning the great flocks. It was indeed at one time reported that the measure had passed, and there was great preparation for trapping the birds among the boys, but their ardor was soon dampened by the failure of this bill in the senate. The statute now gives a bounty for panthers and other wild beasts. There were some idle apprehensions about boys mistaking other birds, and killing them for sparrows, but this was an insinuation touching the intelligence of our boys that has no foundation in fact. Until 1887 I could not understand why the fruit growers and gardeners about our eastern cities talked so much about the sparrows, but when I was forced to stand, shot gun in hand, for several weeks over my fruit and garden crops to save them from destruction by the many thousands of sparrows that had been bred in the city of Watertown, I realized all about it. I am glad to concede that the bird has some merits that should not be overlooked. Its presence in winter when our native species of birds have all migrated, is a daily delight to me; its pugnacity is amusing, but I must confess I cannot enjoy its music, for it consists of a series of saw-filing notes, uttered and reiterated year after year without variation, or sign of developing into genuine bird music. I freely concede that the sparrows to a limited extent are insectivorous during the breeding season, but their insectivorous habits and instincts here have always appeared to me to be more or less a species of dawdling. I have watched them very carefully for years, and once in a while I see them catching and playing with insects, much as a kitten plays with a mouse, idly and for pastime only. There was once a flock of them in my cabbage patch, having great sport with the flea beetle; but I think the beetles made the sparrows sick, for I have not seen the flock since, but the beetles remained. —D. S. MARVIN.

Notes by the Way.—When a person describes a signal success in raising a particular vegetable, fruit, or flower, or a collection of them, as of roses and lilies together, would it not be well to describe the soil and mode of preparation? It may not be as important to us to know that he succeeded, as how we may hope to succeed.

Look out for Sports; a red-berried elder developed on one branch very beautiful cut-leaves, for I think two years; a plant of common mayweed a pretty double blossom; and a variegated violet was one of the nice things among our wild flowers.

What has become of the hybrid bean-peas W. F. Massey of Virginia, told about in 1888?

I bought a hardy hydrangea, or supposed I did; it grew thriftily but did not bloom; was protected somewhat for winter and found rotten at the collar in spring. Why? *Is* it hardy as a lilac? Is the climbing hydrangea hardy?

Cosmos Hybridus did not bloom; perhaps the weather was too dry; will try again, perhaps, and keep in pots till late.

Moon-Flower which started nicely from seed was destroyed after setting by too cold weather, I think. Moral: don't set out too early. Cut off a bit of skin from the seed before planting and sow under glass.

If fearful of drouth, set the chrysanthemums where they can have plenty of water from the kitchen.—MRS. M. P. A. CROZIER.

Condition of the Wine Industry in France.—United States Consul Roosevelt at Bordeaux, has been making an exhaustive study into the wine industry of France. The result of his observations are summed up as follows, in a recent report to the State Department: "There is abundant expert testimony that as good wines can be produced in California as in France. Last year, while in the United States, I daily used California claret and occasionally white wine from the same State, and I do not hesitate to say that I found them superior to the same grade of wines commonly consumed here. It must be admitted that France at present produces finer wines than have yet been made in the United States, but this fact is entirely due to years of experience, exceeding care and the skill employed, and not, as is claimed by the French, to superior advantages of soil and climate. The wine industry in the United States has, owing to its wide latitude, as is attested by pure and agreeable wines produced in Virginia as well as in California, a brilliant future. In view of this fact, there is no reasonable doubt that in time there will be brands of our native wines as famous and as much in demand as those of the celebrated wineries of France."

Higher Education for Florists and Gardeners.—Lord Ashburton said. "We are fitting out man for the struggles of life; we are fitting up a storehouse for the use of a philosopher. Man goeth forth into the world, as a soldier goeth forth into a campaign. His wants are boundless, his means of carriage are small, life is short, knowledge is infinite; what shall his pack of knowledge contain." Horticulture ought to take its place as one of the leading professions. Every man who pursues horticultural work should try to elevate himself; by so doing he would advance this noble art. "But what shall his pack of knowledge be?" He should, as a rule, begin at the bottom of the ladder. Study nature, watch how she provides for the growth and maturity of fruits and flowers, how some are in sunshine, some in shade, some in the bog, some on dry ground. Study the soil, habit and situation of each flower, tree, or shrub that you see. Read all the works upon horticulture you can get. Keep a book, and if you see or hear anything new, make a note of it. Have a scrap book, wherein to put items of importance cut from papers or books, for future reference. Get Cassell, Petter & Galpin's "Popular Educator;" there you will be able to learn, without a master, drawing and painting, designing, botany, geology, chemistry, modeling, and the use of the microscope. All of these things a gardener ought to learn. Use every spare moment you can in study; it will be a pleasure now, and a profit in the near future.

A good plan would be, where four or more florists and gardeners could meet together, to form a debating club on botany and kindred work. It might be the means of educating one another. Ideas would be expressed which would be valuable, and I feel sure that all nurserymen and florists would give practical assistance if employees would form such clubs.

The following incident will show what it is possible to do: One day the Duke of Argyle, walking in his garden, observed a Latin copy of Newton's "Principia" lying on the grass; and thinking it had been brought from his library, called someone to carry it back to its place. Upon this, Stone (the gardener's son), then in his eighteenth year, claimed the book as his own. "Yours!" replied the Duke, "do you understand geometry, Latin and Newton?" "I know a little of them," replied the young man. The Duke was surprised. "But how," said the Duke, "came you by all this knowledge?" Stone replied: "A servant taught me ten years ago to read. Does one need to know anything more than the twenty-four letters in order to learn everything else one wishes? I first learned to read, I next learned arithmetic, then geometry; I then bought a Latin Dictionary, also a French Dictionary and learned them. And this, my Lord, is what I have done; it seems to me that we may learn everything when we know the twenty-four letters of the alphabet." Profit by this, my fellow gardeners, and do likewise; persevere and all things are made easy. —G. M. STRATTON, *Minnesota.*

International Meetings to Consider Viticulture and Fungus Diseases.—An International Exposition of apparatus and products for the treatment against mildew, was held at Rome, from the 23d to the 27th of March, 1890, under the auspices of the Italian Œnophile Club. At the same time an International Viticultural Reunion was held, at which various subjects relating to fungus diseases of the vine, investigations on and remedies for the same, were discussed.—*Insect Life.*

The Bulletins of next fall and winter from the experiment stations will probably be numerous in the direction of plant diseases and economic entomology. Every cultivator should prepare to get and read them.

Horticulture in Common Schools.—Yes, and agriculture? Why not? "For lack of teachers." This is a formidable but perhaps not an insuperable obstacle. How many teachers in the public schools were qualified to teach temperance hygiene well when Mrs. Hunt began her work? Of course very few young girls who "pass" as teachers would at present be able to give much of the needed instruction; but suppose people are in earnest in this matter; that they become satisfied that it will be as profitable for the children to become acquainted with nature, and interested in those occupations which large numbers of them will eventually be engaged in, as to study grammer, geography or even arithmetic, cannot some way be contrived to teach them? Text books may not be at hand, at least till demanded; but children can be taught a great deal orally and experimentally and to advantage. There is hardly a branch of horticultural knowledge that may not be made almost captivating to bright children by a teacher of proper qualifications, one who is wide awake, well informed, and who can impart to them his own enthusiasm.

And is there a town in which some person of this kind cannot be found, who can be hired to go from school to school and give little illustrated lectures, or talks on horticulture or agricultural topics, and occasionally to take the children out to successful farms, orchards, and gardens, to show them just what makes success in these directions! Let him call attention to peculiarities of vegetable life, bring the strange insect into the school-room, show differentkinds of soil and tell how they came to be; or the lime, potash and plaster used as fertilizers, tell where they came from, why they fertilize, and how plants take their food. Set the children themselves to work raising plants, catching insects, investigating, experimenting. The curiosity of childhood is good material to work with.

Is there anything that would do more to wake up mind, develop the observing facilities, educate scientists, and give education a practical direction than this?—MRS. M. P. A. CROZIER, *Michigan.*

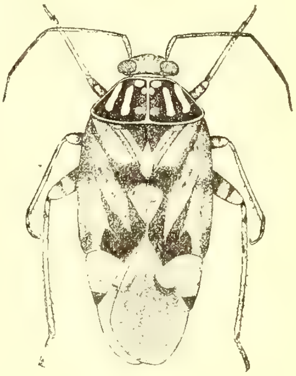
Hard Names for Plants.—We are all delighted at the noble stand some folks are making at the abominably hard names which so many plants receive from those pedantic old chaps, the botanists. Several of my neighbors, fond of gardening, or perhaps I should say more properly, horticulture, come to my house occasionally, and we talk most emphatically against the abominable nuisance. Mr. Poniatowski, who came originally from Varadjadagh, tells me they have the same warfare against the botanists in his land; and my other neighbors, Maillebois of Katzbach, and Khujeet Khang, say that in France, Germany and even in Bombay, the same struggle against hard names is going on. Mr. Khujeet Khang, having been fed in early life on kalo roots a well known plant of our gardens, is particularly violent when these hard names are mentioned. He is a famous dendrologist, arboriculturist and silviculturist, and is much worried when he gets a hard name for a tree. He contends that English, pure and undefiled, is good enough for all the world; far superior, in fact, to his own Asiatic mother tongue. "Observe," he remarked to me at our last meeting, "the obfuscation of the cephalic textural pigment in the pernicious eccentricity of consciousness, during the cerebral oscillations deflected under molecular depression, potentially and periodically evolved under the hypothesis presented by Hecatompybug, the celebrated læcanthropher, that the elucidation of metemphychosis approximates an anomalous complication involving an intermittent exacerbation with periodical collapse, during which the obvious corollary, so far as quantitative analysis develops in the elongated ellipsoid of the cranium in its tumid state, all tends to a paroxysm fatal to pure English." "Where" said he, with fixed fire in his eye, "can you find two who will agree to the exact pronunciation of dahlia, fuchsia, clematis, and hosts of similar barbarous Latin designations?" "When," he said, "I stood on the littoral diabase of the ampitheatre in the archipelago where I could identify by the aid of petroleum in the fenestral alcoves of the castellated structures, in the period of my adolescence, as I did diurnally nocturally, tertianally, quotidianally, and continually; there was no Latin lingo to confuse the mind." The legumes and the follicles masticated by the heterogenous population of his natal home need no Latin to properly engulph them. He firmly believed there would be no oidium among the French vignerons, only for Latin or Greek names. This was the primary and irremediable trouble, which needed no opthalmoscope to discover. There was no fatiguing necromantic phantom, obstructing this sensory operation. It seems to me, Mr. Editor, there is immobility in the facts he presents. Let us have good English, I say, and down with the hard unpronounceable pedantic Latin names.—JULIUS RHOWBOTHAM.

P. S.—Please do not omit the *h* in the first syllable, as, though I am of English descent, our family was originally Greek.

A Woman's Floral Colony.—One of the garden spots of California is on the sheltered slope of San Mateo county, twenty-five or thirty miles south of San Francisco. This is the region west of the Bay that corresponds most nearly with the sheltered hill-slopes and valleys east of the Bay around Niles and the Mission San Jose. Here, near Palo Alto, an association of about a hundred women, all ex-teachers, have bought ninety acres of land on University Heights. Each member holds a title-deed to her piece of land, but agrees to cultivate seeds, bulbs, and cut flowers. Two of the first ladies to organize the movement are Mrs. C. A. Edmunds and Mrs. N. J. Ashton, of Oakland. They can secure three hundred acres of land adjoining the tract they now own, and work has been commenced on a number of cottages. There will be forty or more of the colonists living on the tract within a year. Senator Leland Stanford and his wife have been very much interested in the floral colony, and a great many others are watching its progress.—CHARLES H. SHINN.

Nurserymen's Convention.—Our friends propose, at this session of their Association, to have on hand good speakers who will read papers on subjects of interest to the trade. Professors Roberts, Bailey, Budd, Fernow and Galloway, Hon. H. E. Van Deman, of the Division of Pomology, Department of Agriculture, A. S. Fuller and other well known practical workers, will be in attendance.

A New Celery Pest.—The tarnished plant bug must be added to the list of insect enemies of celery. A recent letter from an extensive gardener and fruit-grower in Kansas informs me that unless he can find some effective remedy for this pest he will have to give up growing celery. The bugs appear on the plants by the thousands, and by sucking the sap from the leaves ruin them.



A CELERY PEST.

This insect is a very common and widely distributed species. The adult, represented greatly magnified in the accompanying figure, is about one-fifth of an inch long, yellowish-brown or greenish-yellow in color, with five whitish lines just back of the head. It is one of the true bugs, obtaining its food through a beak with which it punctures a great variety of plants. It is often especially destructive to pear and apple blossoms, strawberries, potatoes, cabbage, and numerous other fruits and vegetables.

When practicable, one of the surest ways of destroying these tarnished plant bugs is to shake them off the infested plants early in the morning, while they are yet sluggish from the cold, into a vessel containing a film of kerosene. This is a sure cure for those that are caught. Pyrethrum, or buhach, provided always it is fresh and unadulterated, is probably as good a topical application as can be made. Kerosene emulsion is also generally recommended, but my Kansas correspondent says it

Horticultural Registration: The California Idea. At a recent meeting of the State Floral Society of California, three persons were appointed to meet three others from the State Horticultural Society, and this committee sent out invitations to about a hundred prominent botanists, fruit-growers, florists, and amateur writers in different parts of the state. A meeting was held April 17th, and a permanent organization effected. Among those who were interested. and were either present or sent letters of approval, were General John Bidwell, Dr. Herman H. Behr, T. S. Brandegee, Luther Burbank, Leonard Coates, Mrs. Jeanne C. Carr, Elwood Cooper, Timothy Hopkins, L. M. Holt, A. L. Bancroft, Arpad Haraszthy, A. T. Hatch, Prof. E. W. Hilgard, Abbot Kinney, F. A. Miller, Mayor E. B. Pond, E. E. Smith, B. M. Lelong, George Rice of the Bureau of Horticulture, John Rock, G. P. Rixford, John N. Sievers, Dr. Harkness, and many others prominent in various departments of horticulture.

A full and free discussion of the practicality of formulating a "plan for plant registration," occupied the entire afternoon. The value of such a work was admitted by all present, but the entire force of the meeting was directed to the problem: "How far it ie best to go?" Theoretically, it was said, registration should be "of all species and varieties of plant life, and should secure to the originators of new varieties of fruits, flowers, and plants, the exclusive rights of propagation and sale, for a limited time." Practically, as most of those present thought, the main thing was to have a register of plants that would put an end to the "confusion worse confounded" of the catalogues, and if a "copyright plan" could be adopted, the larger benefits of advertising and disseminating a new variety would be secured.

One speaker said in effect that "the proposed law must be as simple and practical as possible, or it could not succeed. It must win the support of the better class of agricultural journals, and the leading American newspapers. It must be for the "greatest good to the greatest number," and free from all class-legislation. It must not try to do too much. If the cultivated fruits, vegetables, and flowering plants now known in America were registered under their present most generally accepted names, in the office of the Agricultural Department at Washington, the work of keeping up the register would not be too difficult, because then a fee could be charged for every plant entered.

An important part of the discussion was upon the "registry of botanical species." It was generally held that only species that were in commercial cultivation need be considered at present. The botanist does not need any "register of plants," for the scientific system and vocabulary that he uses secures him from confusion. It is the farmer, gardener, nurseryman, florist, fruit-grower and general horticulturist who finds that the existing confusion of nomenclature is unendurable.

The "California Idea" which Mr. A. L. Bancroft and several other gentlemen have been working on for a year or two, is that all varieties of cultivated plants can be identified sufficiently for practical purposes, in the experimental grounds at Washington, and registered there in such a manner that the fact of registry will be of value to nurserymen, seedsmen and florists, and will do away with a vast amount of fraud and annoyance. The details of a plan to accomplish this desirable result are now being arranged by the working committees of the organization which I have been describing, and will be presented to the floral and horticultural societies, and sent to the leading American publications for comment and criticism.—Charles H. Shinn.

The American Association of Nurserymen meets at Park Avenue hotel, New York city, June 4 to 7. The best programme which the society has yet had is to be presented. It reads as follows:

The Question of New Fruits. H. E. Van Deman, National Pomologist.

Some Remarks on Root-Grafting. L. H. Bailey, Professor of Horticulture, Cornell University, Ithaca, N. Y.

Are Hardy Perennials Desirable for our Catalogues? Jacob W. Manning, Reading, Mass.

Can Stock be Dug and Shipped too Early in the Fall? G. E. Meissner, Bushberg, Mo.

The Cause of Low Prices for Nursery Stock. Hon. S. M. Emery, Lake City, Minn.

Do We Live and Learn? Thomas Meehan, Germantown, Pa.

Chestnut Culture. Samuel C. Moon, Morrisville, Pa.

Does the Future of our Business look as Promising as the Past? H. S. Wiley, Cayuga, N. Y.

Elevation of our Business. C. L. Watrous, Des Moines, Iowa.

Hardy Fruits for the West and North. Professor J. L. Budd, of Iowa Agriculture College, Ames, Iowa.

Nurserymen, Agents, Tree Peddlers and Bugs. Geo. J. Kellogg, Janesville, Wis.

Advertising—How Can it Best be Done? G. J. Carpenter, Fairbury, Neb.

Peach Orchards of the West and South. N. H. Albaugh, Tadmor, Ohio.

The Relation of Nurserymen to the Forestry Problem. B. E. Fernow, Chief of Forestry Division, Washington, D. C.

A Talk on Fruit Growing as a Business. S. D. Willard, Geneva, N. Y.

The Future of Nut Culture. A. S. Fuller, Ridgewood, N. J.

Transplanting Evergreens. Fred. W. Kelsey, New York City.

Thoughts on Soil Fertility, Applicable to the Nursery. Professor I. P. Roberts, Director of the Cornell University Experiment Station.

Home Grown vs. Foreign Stocks. E. W. Graves, Sandwich, Ill.

New Small Fruits. F. R. Palmer, Mansfield, Ohio.

Russian Varieties of Fruits. Leo Weltz, Wilmington, Ohio.

Leaf Blight on the Pear as Affecting Nursery Growth, and its Remedy. Professor B. T. Galloway, Chief of Section of Vegetable Pathology, Washington, D. C.

Has He Ruined Eastern Farmers by His Success in Peach Culture? J. H. Hale, So. Glastonbury, Conn.

The Grape—Its Character, as Affected by Climate and Situation. Geo. W. Campbell, Delaware, Ohio.

Suggestions for Packing Nursery Stock. By a member to be named later.

Callas in California.—In the February issue, advertising page 10, you say: "The calla wants water like a mill, heat like a furnace and feed like an army." I think that an extreme opinion. My callas in the open ground have bloomed all winter, with only the natural rainfall for water; the temperature averaged 40 to 50 degrees by night and 50 to 65 degrees by day, and the soil has never been manured. I am safe in saying that a bed of 100 bulbs planted less than a year gave us over 1,000 blooms, and now in its second year, I think there are nearly 2,000 large and fine flowers. Some I measured were 10½ by 6¼ inches.—E. Leedham, *San Luis Co., Cal.*

Catalogues that Instruct.—Your correspondent on page 305, May Garden, hits the nail on the head in criticism of C. L. A.'s remarks in the March number. I know of an honest seedsman, whose catalogue was a perfect encyclopedia of careful instruction, with a calendar for the operations of every month in detail. His gratuitious information (the result of long experience) took up fully twelve pages of his expensive catalogue. He sold good seeds; yet the people who got his catalogue must have bought our friend R. T. Choke's Inexhaustible Sure-pop cabbage and other "specialties," and planted them by the honest seedsman's instructions, for sure they didn't buy of the latter! When the apostle of catalogue humbuggery is now reputed to be gathering in $50,000 yearly profits from his "novelties," and such, is there encouragement for the straightforward dealer to offer instructions instead of vivid descriptions, a cook-book instead of an overdrawn illustration? The way to educate the dear people against being humbugged is through our honest horticultural publications, not through catalogues; and even then we much fear that they will want a few seeds of the wonderful Everbearing Watermelon Gooseberry at 50 cents a packet!—J. H. McF.

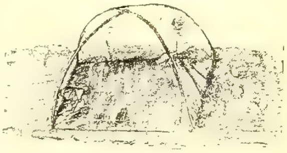
Black Walnut Plantations.—S. B. Conover, on page 308, speaks of black walnut plantations as something new—he "recommends land owners and farmers to turn their attention to growing black walnuts." The recommendation is good, for it may reach many who have not considered the matter, and the details for planting are also excellent; but the idea is not new, and has been extensively acted on in the western states, where many quarter-sections have been planted to walnuts in the last five years.—J. H. McF.

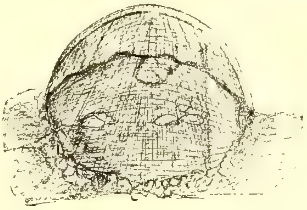
Remedy for Melon and Cucumber Pests.—Mix one teaspoonful of paris green with three gallons of water; as the plants get stronger, strengthen the mixture by mixing one teaspoonful of the paris green with two gallons of water; stir well so that the whole will be of equal strength. It should be applied to the plants at intervals from the time they show their full leaves until the fruit begins to ripen. Apply with a watering pot, using a fine rose. When the mixture is judiciously used it acts as a stimulant, and creates a healthy, vigorous growth. Any practical gardener would know from the appearance of his plants how frequently the mixture should be applied. The inexperienced gardener should apply at intervals of eight or ten days. The mixture should be applied in the early evening, but must not be used on cool, damp days. The green fly will not succumb to moderate applications of this mixture, so I would advise that tobacco be sprinkled over the leaves of the plants to rid them of this pest. In this treatment the plants must be given good care and the applications be made regularly.—PHILIP RYAN.

[NOTE.—The above communication is not clear as to what insects are routed by the paris green application. If the treatment "acts as a stimulant" it is evidently only because it is a means of watering the plants.—ED. AM. G.]

takes an emulsion containing twenty-five per cent. of kerosene to kill them, and he says this strength injures many of the celery plants. Mr. C. W. Woodworth has lately recommended *kerosene powder*, made by thoroughly mixing five parts kerosene with one hundred parts of some powder, like air-slaked lime, plaster, etc., for this purpose, and it seems to me well worth a trial.—C. M. W.

Striped Cucumber Beetle.—There is no way of preventing the injuries of this little pest so sure as that of fencing them out by some mechanical protection to the plant. One of the simplest methods is to cover the hills with a piece of thin plant cloth or cheese cloth two or three feet square, fastening the edges down with some loose earth. But it is better to hold the center of the cloth up by means of a half barrel hoop, or wires bent in the form of a croquet arch, as shown in the accompanying figures. The plants grow rapidly and thriftily under these, and the cloth, besides protecting from the beetles, saves the plants from frosts.—C. M. W.





The Vicar of Winkfield.—The Vicar pear has not been valued as it deserves. As the tree grows larger it bears larger and better fruit. Few pears are handsomer or better flavored than a good specimen of the Vicar. But its goodness depends very much upon the treatment it has had. I know of a gentleman who always had his Vicars pruned when the fruit was as large as a hickory nut. If the fruit was growing in clusters close together, two were always taken out of every three, keeping the fruit well separated. When the fruit was gathered it was not put up, but kept out in the cool air until frost was expected. Then each perfect pear was wrapped in thin paper and placed carefully in boxes or barrels, and removed to the cellar until February. Then it was sent to Boston market and brought a good price The Vicar is a good fruit for eating when fully ripe, also for cooking even before it is fully ripe. The old fashioned "boiled dish" is much improved by plain boiled pears. They are delicious baked in plates with no addition of sugar and the plate only half filled with water, covering to prevent burning; also pared and cooked in a deep crock with the addition of sugar and water. They are also excellent for marmalade, paring and quartering, and when nearly done adding a glass of quince jelly to give a flavor unsurpassed. Made into marmalade without paring, only quartering, and chopping finely, they are excellent, putting less sugar and adding sweet cider.—M. S. W.

Fruit a Wholesome Food.—In a paper recently read before the Columbus (O.) Horticultural Society, Prof. Wm. R. Lazenby said: In our climate, subject as we often are to great and extreme changes of temperature, passing abruptly from extreme cold to almost tropical heat, the system usually becomes more or less debilitated, and in this condition we are predisposed to malarial and other fevers, particularly if we live where the drainage is poor. Fruit, on account of the free acid it contains, is a great corrective for this general debility. These organic acids are antiseptic. They tend to destroy disease germs that may have found a lodgement in the body. Their beneficial effect may be partially overbalanced by the indigestibility of certain fruits, caused by the coarse and hard condition of the cellulose. All good fruits when perfectly developed and properly matured are, as a rule, easily digested. We know that unripe fruit is not wholesome. It does not readily digest, but is likely to ferment and decompose in the stomach, oftentimes giving rise to serious disorders. The same may be equally true of over-ripe or partially decayed fruit. If it is unwise to take into our bodies that which will decay and ferment, it is also unwise to use fruit in which these changes have already begun. The question is often asked whether such or such a fruit is "healthy." This is bad English, unless you have special reference to the condition of the fruit or fruit-plant itself. We can say, however, that the teachings of chemistry and physiology, as well as our own experience, show that "*healthy*," mature fruits are *wholesome*, and the best result possible from their use as food is to have an abundance of the best varieties, each in its season, and to know that they are the product of your own skill and industry.

The Brigdon Peach.—This peach originated in Cayuga county, N. Y., and is being grown quite extensively on the shores of Seneca lake. It gave a very remunerative crop last season. The tree is hardy and the fruit large, remarkably handsome and more productive than the Early Crawford. The foliage is large, green, glossy and peculiar. The flesh of the fruit is yellow, very rich and juicy, with a pleasant flavor; color of fruit, deep orange-red, becoming dark red on the exposed side. It is attractive and has been universally admired wherever exhibited, and has taken the first premium at the Cayuga county fair for three years. Its season is the middle of September, and it is a freestone. —G. W. CHURCHILL.

Fruit Growers' Compact.—The following compact was recently adopted by the South Haven (Michigan) Pomological Society to aid in the marketing problem: "We, the undersigned fruit-growers, believing that a better system of marketing than heretofore practiced may be devised, hereby constitute and appoint——— our agent to look up markets, solicit orders, seek freight rates, and make sales of fruit that may be put into his hands for sale or shipment; and each of us agrees to pay the expense of said agent, in proportion to the fruit put in his hands by each; further, that any person may at any time withdraw from this agreement on settlement with said agent and payment of his proportion of expenses incurred."

Orange growers in some portions of Southern California are beginning to question the supremacy which the Navel orange has heretofore held. As the trees grow older it is found that their bearing capacity does not increase as rapidly as does that of a good seedling or of the Mediterranean Sweet. It is true that the Navel thus far brings the highest price, but a good seedling tree will in the end bring in more money.

Pear Blight Again.—With reference to my statement that the injury to a blighted pear tree consisted in the butyric fermentation of the starch in the bark, Prof. J. C. Arthur has kindly called my attention to his own investigations, the results of which he states as follows: "The chemical changes induced by the bacteria in the plant tissues are in part the formation of a gum and disengagement of carbon dioxide, but not of alcohol, butyric acid or any of this series of compounds, at least to any important extent; and lastly that the change is not putrefactive or alcoholic, but in all probability viscous."—A. B. SEYMOUR.

Women as Raisin Growers.—A great many California women are investing in raisin vineyards. The favorite plan is an incorporation to secure the land. Stock is issued, and assessments levied upon it. The expense of land, water, planting, and culture can be very closely calculated beforehand, and quarterly assessments are made until the vineyard is in bearing. So far, every enterprise of this kind has been a success. Tracts of one or two hundred acres costing from fifty to sixty dollars an acre, are preferred by these associations. Most of the women who take stock are teachers or stenographers, with two or three thousand dollars savings. They can make more, after the fifth year, than by any other equally safe investment. Raisin-grape vineyards are the favorite form of investment for such associations. They do not as yet attempt wine-making, or general fruit-growing. A prune or fig or almond orchard might be as easy to manage as a raisin vineyard, but the system by which raisins can always be sold in the sweating boxes to packing companies, greatly lessens the care and expense.—CHARLES H. SHINN.

The Peach and Apricot Orchards of California.—By the latest and best estimates there are now growing in California orchards at least 10,000,000 (ten million) peach and apricot trees, two-thirds of which are peaches, and two-thirds of both species will be in bearing the coming season. These trees will soon give a total product of 40,000,000 40-lb. boxes of fruit, or 160 millions of pounds, yet the best posted commercial fruit men of the state insist that there need be no fear of a glut from overproduction, either now or in the future. In fact, the demand is constantly beyond the production. Nothing but the opening up of some great new country with a climate and soil for the peach, nectarine and apricot the equal of this, will give the world more of these fruits than it will absorb. Where is such a country to be found? Possibly South Arizona and parts of old Mexico will compete. But even then California will have the "bulge" for a score of years. These orchards paid last season from $50 to $350 per acre *net*.—D. B. WIER, *Petaluma, California*.

Strawberry Raising for the Girls.—The farmer is so busy and has so many things to attend to that the strawberries will not be likely to get the care that they need. It is quite a science to raise large crops of fine berries; one must read and study, and then attend to them at just the right time all through the season. This pays finely when one makes a business of it. One day my girls were telling me that they wanted to do some work away from home so as to get some pocket money. It struck me this was a laudable ambition, and the strawberry business occurred to me, and I asked them how they would like it to take charge of the whole matter and pocket the money. Well, the result was I gave them the nicest, richest (mark that—not some poor corner) piece of land on the farm, and have engaged from a grower what plants they will want, leaving the choice of varieties to him. I have bought them books enough to study, so they can learn all that is possible in that way. The men will plow the ground when we do the rest of the lot, and harrow and roll it; and when we are cultivating potatoes we will run through the berries; but the girls are to take the whole responsibility. I think it will do them good. It will teach them business. It will be healthful work. I thought best to start them with a little over one-fourth of an acre, not on account of lack of vim, but because I have learned that concentrated farming is best, in the berry patch as well as elsewhere. In a year or two they can spread out a little if desirable. I do not hesitate to advise any farmer or other person to go at it in this way. It will cost only $5 or $6 for plants. About the market: Make one among the people living right around you. There are ten bushels of strawberries sold in Hudson, where I live, now, where there was a quart when I first came on the farm, and the end is not yet by any means. Plenty people would buy nice fresh berries at a living price, hey were put right before them, who hardly know taste of the fruit now. Now, I want to stir up the ildren as well as the old folks a little by telling what has been done on a single quarter of an acre I have seen the ground, and spent four days with the man who did it—the venerable J. M. Smith, of Green Bay, Wis. It was not convenient to measure all the land and keep track of the crop, so our friend marked off one-fourth of an acre and picked from it 3,571 quarts—the largest crop, it is said, on record. Just think if you do not know of hundred acre farms that do not do much better. At 10 cents a quart this would be $357. This is enormous, but not greatly above Mr. Smith's average. From 3½ acres last year, although terribly dry, he sold $2,215.24 worth berries, besides taking plants to the value of $300 from the same land in the spring. But this was not enough. After the berries were picked he plowed the patch and put in cabbage and celery—$700 more! Just $3,215.24 from 3½ acres of land! I took the figures right from his books, where each day's sales were put down. There isn't a question about their exact truth.—*T. B. Terry, in Gleanings in Bee Culture.*

The Worden Grape is commonly supposed to be a poor shipper. If picked as soon as fully colored, however, it will ship well.

Mr. Worden, the originator of the Worden grape, still lives near Oswego, N. Y., a very old man. He is still working at the origination of new fruits.

From New Mexico.—One of the greatest needs of orchardists and gardeners in this new region, is very full and frequent quotations from markets. All such quotations regularly given for a series of years would be a guide of great value. The value would be greater still, if it were possible to make quotations from different points of supply and markets of consumption, for instance: New York, Baltimore, Chicago, Kansas City, Salt Lake and San Francisco, or others. Being without information, the orchardist is at the mercy of the commission or packing house, and the buyer for retail purposes is not much better off. Besides, in this Rocky Mountain region where fruit-tree planting is occupying a great deal of attention, and where it is of the greatest importance to plant the best varieties for the markets which must consume the produce ten years hence, the need of some reliable guide is greatly felt. There can be no surer guide than the open market, and any concern which will give regular and reliable quotations of some of the largest markets will be regarded by the gardener and orchardist as a benefactor to his business. —ARTHUR BOYLE, *Santa Fe, N. M.*

Peach Yellows.—The interest taken in Dr. E. F. Smith's bulletin on peach yellows, issued from the Department of Agriculture, may be measured by the fact that second-hand book dealers are selling it for $1.50, the original edition having been exhausted.

The Patterson Peach is a new variety which originated at Greenfield, Hancock county. The Indiana original tree is five years old, and in 1888 bore one bushel of fruit, all of uniform large size, four specimens weighing 31½ ounces or nearly 8 ounces each, and measuring 3¾ inches in diameter. Last year the best specimens, four, only weighed 22 ounces, as the tree was overloaded, having 2½ bushels of fruit on it, and it had not been thinned out any. Bark very smooth and fine, dark colored, more like a plum or cherry than peach. They have never thrown out a limb or sucker below the head which is 3½ feet from the ground. The trunk of the tree is 3¾ inches in diameter, one foot from the ground. There will be no trees for sale for a year yet.

Cold Graperies.—The peculiar method of glazing spoken of in the March issue (p. 186), in which spaces of half inch are left between the panes of glass, looks like a very "cranky" notion to an old grape grower. We grow exotic grapes under glass solely because we are thus enabled to control the atmosphere surrounding them, keep it close or otherwise, impregnate it with sulphur, tobacco fumes, etc., to destroy fungi and insects, and finally, but by no means least, to keep moisture away from the vines at times when it is not desired. None of these purposes could be served by a house with such a latticed glass roof. It may be, and is desirable to keep the ventilators open night and day at certain periods, but never during storms, and the inside borders can be better supplied with moisture artificially when needed than to be drenched with rain when the fruit is ripening. I like abundant means for giving air in a grapery when needed, but want to be able to control the air and prevent draughts. Mildew, I apprehend, would be totally unmanageable in a house with such an open-work roof, and I had as soon undertake the culture of *Vitis vinifera* in the open air at once. After grapes have begun to color, and not until then, do I admit a general draught of air through the house by ventilating above and below at once, but even then it is of importance to close out rain storms and keep as dry as possible. Keeping the lower ventilators rigidly closed during the swelling of the fruit from first to last, with sulphur exposed to the sun along under the lower edge of the glass, will usually keep down mildew during the period when heavy syringing is desirable; but drip on the foliage and a thousand little draught holes in the glass, would set it going, despite the best care. I see very little said now a days about grape growing under glass. Is it getting to be a lost art among gardeners?—W. F. MASSEY, *Raleigh, N. C.*

From North Carolina.—After several years successful cultivation of grape vines under glass, I should think that the method of glazing vineries spoken of by Mr. Williams in the March number of THE AMERICAN GARDEN, hardly a good one. While there may be times during a season that it is advisable to have plenty of air in the grapery, I prefer to have it more directly under my control. The same may also be said of the water; if during the time the vines are blooming the weather should be wet and cold, as is sometimes the case, I fear that with the glass at all apart so that there would be much leakage, the result would be a *bad set* of fruit, especially in the more tender varieties. A grape roof, in my opinion, should be as nearly water tight as possible if the best results are to be expected. If a person is going to depend on an open roof through which to supply his vines with air, and the inside border with water, he need not be disappointed if he is not as successful with his vines as some of his neighbors, who attend more closely to the watering and airing of the vines.—R. G. MILFORD, *Asheville, North Carolina.*

Michigan Peach Prospect.—Late advices report that in most parts of the famous Michigan "peach-belt," the prospects are good for a fair to good crop. The blossoming is comparatively light, but this means less thinning of fruit and finer peaches. Early in the season it was reported that the freeze of early March, following a very warm February, had destroyed the whole crop, but the injury is not so great as was feared.

The Cassava.—I am fully persuaded that no other single article of food on the face of the earth would go so far toward sustaining animal life as the cassava root. There is an agreeable living in it for more animals of both the higher and lower orders than in anything else in existence. No one need lack for food where there is a good cassava crop. The Spaniards term it "The Life of Man," so Uncle John Parker stated, and he was associated with them much in the stock business. If they had added, "And all other Animals," it would not have been extravagant. I believe that everything we have ever offered it to on our place will eat it. I cannot say for certain that we have ever offered it to the dogs, but I am of the opinion that if you would fry fritters of it and spread on good butter, that they, too, would eat it.

Now there is no doubt in my mind but that thirty tons of cassava root per acre can be produced. When I think of the tapioca, glucose and starch there is in it, and how abundantly it can be turned into bacon and lard, milk and butter, mutton and beef, and that at least one-third of our horse feed, in the line of grain, can be saved by it, I feel confident that it will pay better than any other plant in the world.—*S. W. Carson.*

A New Use for Beans.—Cheese made from beans is largely used in China. For fertility of expedient the almond-eyed Celestial can double discount the most ingenious Yankee. While such cheese would not seem to be very palatable or nutritious, yet it is said to be quite salable and profitable to the manufacturers. Introducing it into the English market is talked of. Owing to its low price it will probably encroach to some extent upon the product of the old reliable cow. Poor people will buy anything cheap that is good to eat. Their pecuniary condition compels them to do so, so this substitute will probably find a large sale. At all events it is extracted from a harmless substance. No one that we know of has ever died from the milk of a bean. Let our English cousins thoroughly test it, and if it doesn't make them sick, we will try it. Now let the American cow prepare to meet close cut-rate competition.—*N. Market Journal.*

Lettuce Mildew.—At the Ohio Station we rece had a bit of experience with this fungus. In the pro gating houses a test of varieties of lettuce for forcin was in progress, and during a few days of cloudy weather, mildew suddenly appeared, passing rapidly from plant to plant, and threatening to ruin the whole lot in a day or two. As soon as the attack was noticed the infected plants were pulled out and carried away, the ground was well stirred, and no more water was applied to the soil. This checked the disease immediately, and sunshine appearing the next day, no further damage was done. But since then we have been careful about letting the soil get too damp.—C. M. W.

Trouble with Melons.—Can you bring out in your pages a remedy for the dying out when the fruit is half grown, of the melons, cucumbers and squashes? I have always thought it a small fly which deposits its eggs in the stem. Riley thinks it is a fungus. I like melons morning, noon and night and between times, and their loss is a serious evil.—S. B. P.

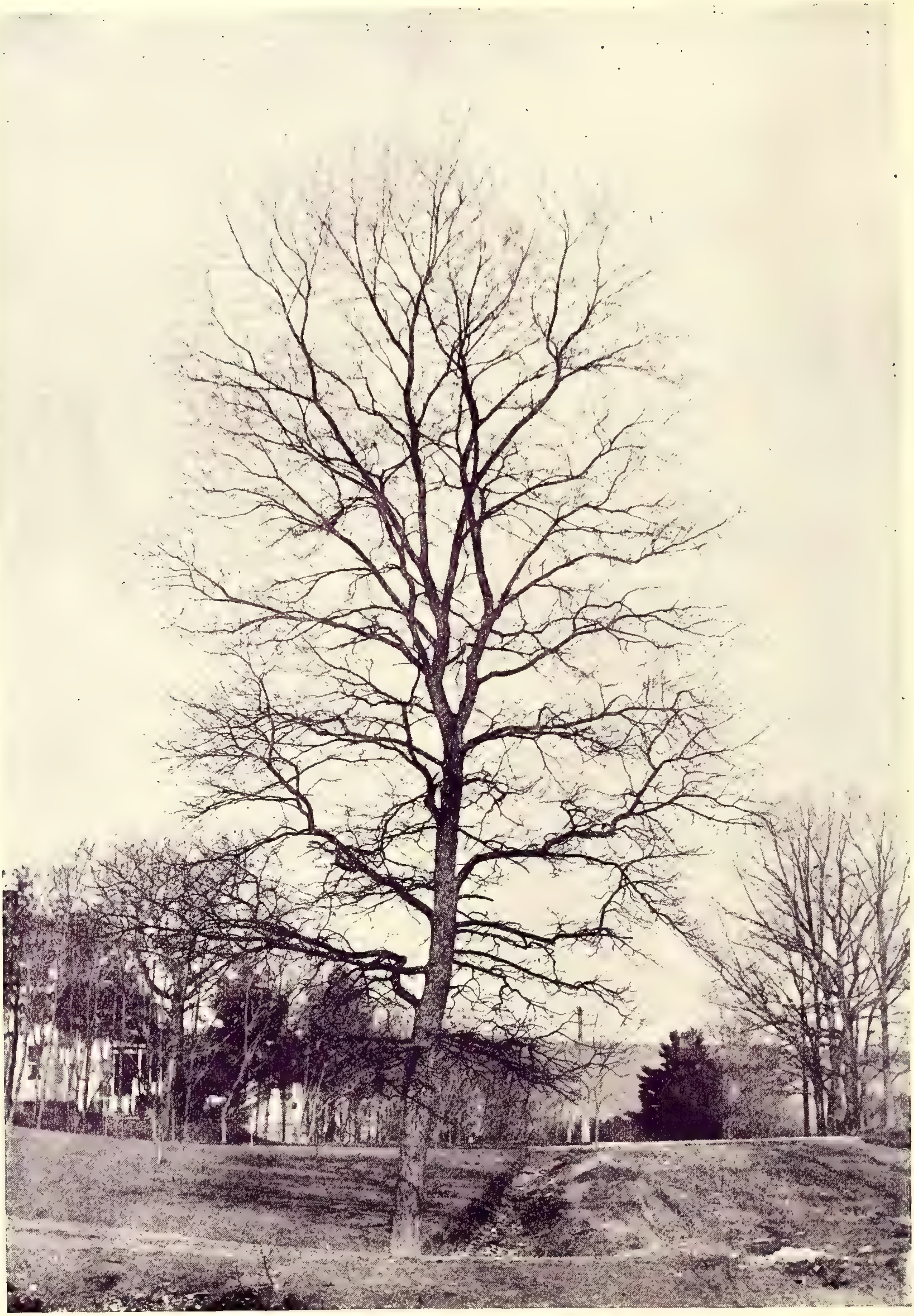


Fig. 1. The False Shag-Bark Hickory. (See page 386.)

The American Garden.

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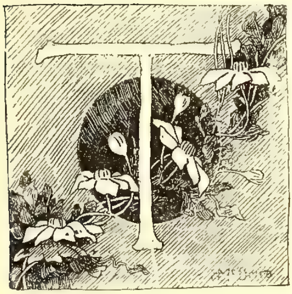
THE OUTLOOK FOR ECONOMIC ENTOMOLOGY.



THE PAST twenty years have been very fertile with practical results in the warfare against insects. Not only does this period include a remarkable advance in our knowledge of the life-histories of pests, but it is distinguished by the discovery of far-reaching remedies and the true beginning of national investigations. Many obstacles have been overcome, and the economic entomologist is to-day prepared by this work to offer fairly satisfactory remedies for a great majority of our most prominent insect pests. Many problems yet remain unsolved, however, and work upon these will engage the best energies of our workers in this branch of agricultural science for many years to come. They include, among other things, the improvement of remedies already known, and of insecticide appliances, together with the investigation of the new insect enemies to agriculture, which are, in our comparatively new country, constantly making their appearance, either from change of habit or of food-plant of some hitherto innocuous species, or from the importation of species from other countries.

All late advances in the study, and all probable advances in the immediate future, come under three chief categories:

1. The ascertaining of every detail in the life history of species at present injurious or likely to become injurious.
2. Thorough and careful experiment with insecticide substances.
3. The invention and improvement of apparatus for the application of insecticides.

(1) The first of these three categories is fully as important as the last two, since upon the careful performance of the work indicated depends the question of prevention and of ridding ourselves of our enemies by natural means. It even influences, in a potent degree, the proper application of insecticides, thus underlying and forming the basis for work in the second and third categories.

Take the case of the codlin moth, for example. Had we not learned by careful examination that the larvæ, leaving wind-falls, crawl back to the trunk of the tree in order to find proper places for spinning their cocoons, and leaving apples before they have fallen, crawl down the limbs to seek the rougher bark of the trunk, the admirable bandage remedy, our principal means against this pest before the use of arsenical sprays had proved safe and satisfactory, would never have come into use. The discovery of the applicability of the sprays themselves was to a certain extent empirical; yet a knowledge of the egg-laying method and of the habits of the newly-hatched larvæ at once explains its applicability and proves to the cautious man its theoretical efficacy.

Take another and perhaps even more striking example: From 1874 to 1878 the thick-thighed walking-stick, an insect which had previously been considered harmless, did a great deal of damage to shrubbery and forest trees in Yates county, N. Y., completely defoliating the hickory and oak timber. So many acres were infested by the insects in large numbers that the application of arsenical poisons was practically out of the question; but a study of the life-history of the insect disclosed a safe and

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comparatively inexpensive remedy. Visiting the woods in the latter part of autumn, a constant dropping, like falling rain, was to be heard, and this was considered to be due to the dropping of their excrements by the thousands of these leaf-destroyers. Close examination, however, showed that the particles thus constantly dropped from the trees were eggs which fell loosely upon the leaf-covered ground, and so abundantly that they could be scraped up in places in great quantities. Thus, by recommending the burning of the leaves during winter, I was able, by a very simple means, to give those who suffered complete protection for the future.

No fact, however seemingly insignificant, should be overlooked, and not only must the round of the insect's life, as it appears at the time and point of actual damage be studied, but every fact in reference to the species—its original home, its spread, its natural enemies—wherever it exists, must be ascertained and recorded. The significance of such information as this is shown with striking force in the case of the fluted scale (*Icerya Purchasi*), an insect coming from Australia, and which has been extremely destructive to citrus fruits in California. In this case the investigation as to the original home of the species, which required some years and a trip to Europe, resulted in the discovery of a natural enemy in its native country which not only kept it in perfect subjection there, but which, with the coöperation of the State Department and through one of my assistants, Mr. A. Kœbele, I was enabled to introduce and colonize in California. The result was almost magical, for within a single year the icerya has been practically swept away, bringing about an immense money-saving to the citrus-growers of that state with the expenditure of a very insignificant sum on the part of the government.

Investigations of this kind are often attended with extreme difficulty in the accurate ascertaining of every possible point connected with the life of the insect, and occasionally such knowledge makes the question of remedies seem only more complicated. An instance of this kind is afforded by the buffalo-gnats of the south-west. It was known from the beginning of the investigation, which I undertook in 1886, that the early stages of this fly are aquatic; but, nevertheless, the problem was attacked with the belief that, however hopeless a case may at first seem, a careful study of all the facts may show some vulnerable point and give man the advantage. The work of the first year resulted in discovering the breeding-places, the eggs, the larvæ and the pupæ, in ascertaining the life periods and in bringing together much other information; but now, after four years of more or less consecutive investigation, we can suggest no direct remedies other than slight improvements upon the repellants already in use against the adult insects before we took the subject up. Even this rather difficult and discouraging investigation, however, has not been entirely without its practical result. The habits of the larvæ having been to a large extent ascertained, it became evident that the removal of the fences across streams, and of stationary logs and "snags" would, in a large measure, prevent the breeding and reduce the number of adults. This is a matter for local or general legislation, rather than individual adoption, and, as shown in recent reports, the general government has become responsible for a rather widespread buffalo-gnat supply in north-west Louisiana, which would be greatly relieved by the removal of an enormous raft of logs in Bayou Pierre.

It is in this direction of prevention that our best energies should be exerted, for in this direction the promise of the future is great. Effort here should be founded, as just stated, upon the most accurate knowledge of life-history and habits, and in its broadest application it depends for its successful outcome upon county, state or national legislation and the intelligence and entomological knowledge of the officers entrusted with the carrying out of such regulations or laws as may be enacted. And right here is the great danger of the future. Even the most enlightened legislative bodies are liable to error and, in this country particularly, the all-pervading influence of party politics will bring about the appointment of incompetent officers. Even the international conference at Berne, through insufficient knowledge of details, passed unjust and over-stringent regulations regarding the grape phylloxera which have injuriously affected the plant exporters of this country, while the incompetence of appointees has almost invariably lessened the good accomplished even where the legislation was wise. The several districts of California, in spite of stringent quarantine laws, have, by incompetence of inspectors, admitted injurious scale-insects from Florida and from abroad, while the very recent measures adopted by the legislature of Massachusetts for the suppression of the gipsy moth (*Ocneria dispar*) bid fair, as I am informed upon reliable authority, to utterly fail of their result by the appointment of a commission to carry them into effect composed of a country doctor, a Boston business man and a market gardener—all three without the least entomological knowledge. When applied entomology becomes coupled with politics, there is always danger that it will fall into the hands of incompetents, or worse—men who owe their influence to politics and political methods.

In the direction of wise legislation, however, there is much to be done in the immediate future. There is always danger of the importation of foreign pests, and the different sections of our own country should be on their guard against the introduction of injurious insects from other sections. A whole catalogue of pertinent illustrations might be cited.

(2) The greatest advances of the past few years in the line indicated by the second category, have been in the discovery of the applicability of arsenical poisons against biting or masticating insects; in the extension of their use against many species which were not at first thought to be amenable to treatment by them; also in the discovery of simple methods of emulsifying kerosene or other oils so as to permit of their ready dilution and their consequent use without danger to foliage.

The use of Paris green, first successfully tried against the Colorado potato-beetle, and afterwards used extensively against the cotton-worm, the boll-worm, the canker-worm, and more recently against the codlin moth, plum curculio and many other mandibulate species, marks an era in the warfare against insects. Cheaper arsenical preparations, like London purple, have also proved most satisfactory. Next, perhaps, in importance, is the discovery of the petroleum emulsions, as used against haustellate or sucking insects. Though originally aimed at the cotton-worm and an outgrowth of the cotton-worm investigation under the U. S. Entomological Commission, treatment with these emulsions in their various forms has been extended to all varieties of bark-lice and plant-lice, as well as to many gnawing insects which chance to feed upon crops which it would be dangerous to spray with arsenicals.

Many variations in the preparation of arsenical mixtures and the kerosene emulsions have already been tried, and doubtless many more yet remain to be tried. Necessary variations in special cases often occur. In my search for a proper wash against the fluted-scale, I met with the necessity of finding a mixture which would penetrate the seemingly impervious wax covering of the egg-sac, or which would harden it to such a degree that the lice, on hatching, would be unable to escape. This was finally accomplished by the addition of resin to the washes, and insects of this character, such as the cottony maple-scale (*Pulvinaria innumerabilis*), the Florida wax-scale (*Ceroplastes Floridensis*), the barnacle scale (*Ceroplastes cirropediformis*) of this country, and the cottony currant-scale of Europe (*Pulvinaria ribesii*), can now be successfully treated at any stage of their existence without the necessity of waiting for the pregnable period of the hatching and migration of the young lice.

The lessening of the expense of these successful washes is another important point for the future experimenter in this line; and we have before us an immediate need of a careful and exhaustive series of experiments as to the relative effects of the arsenicals and the emulsions upon the foliage of different plants. Our knowledge in this direction at present is slight. Yet we should know with certainty not only just what effect a certain mixture will have upon the vitality of a given plant, but what effect it will have upon this plant in a particular part of the country, with a particular sun exposure, at a certain time of the day, with certain conditions of plant-vigor and precipitation, at a certain season of the year and at a certain period in the life of the plant. We know, from experience, that all of these conditions have strong bearings on the effect of the poisons upon vegetation, yet this line of investigation, first suggested in 1885, has still to be thoroughly followed up. The combination of two classes of insecticides for simultaneous application to two classes of insects affecting the same crop, as a combination of Paris green and kerosene emulsion for the treatment of apple trees affected with bark-lice and apple-worms, or canker-worms, or the same mixture for young cabbages bearing both lice and caterpillars, will afford opportunity for much useful work in the future. In a like way, the combination of a fungicide and an insecticide for the simultaneous treatment of insects and fungous diseases affecting the same crop, is beginning to be practiced and offers a field for future experimentation.

We look to the immediate future not only for the improvement of substances already in use as insecticides, but in a lesser degree for the discovery of new ones. Private individuals, from the commercial standpoint, are continually inventing and placing on the market new insect poisons. In the great majority of cases these remedies are but tributes to the gullibility of the great American public, but we may reasonably expect now and then a discovery of value. It is better to have a discovery of this character made privately, and patented to the gain of the individual, than not to have it made at all; but the added expense to the public at large furnishes the strongest argument for increased activity on the part of state and national workers in this direction. Every promising field should be explored by such officials, and every discovery should be made of free and instant avail to the people.

There is room for gain, without patent protection, to many manufacturers in the utilization of certain by-products, either as actual insecticides or as the carriers of poisons. Such products can often be placed on the market, by parties having exceptional facilities, at a reasonable or even large profit, and deserve, where worthy, every encouragement; but the ease with which patents are obtained, particularly in this class, offers a great temptation to the unprincipled and avaricious, and more than one mixture is on the market to-day which does not deserve protection.

3. Much that I have just said applies with equal strength to the past and future of our third category, the invention and improvement of insecticide appliances.

Advances in this field have been rapid since the discovery of insecticides which can be economically applied to extensive field crops or orchards, and chiefly date from 1878, when the thorough investigation of the cotton-worm began. This insect multiplies so rapidly, and its food-plant is grown in fields of such great extent, that spraying machinery of considerable power was necessary for the application of those insecticides which were found to be of avail. Many mechanical devices, however, had been invented a few years previously for destroying locusts on a large scale during the investigation of the Rocky Mountain locust (*Caloptenus spretus*). While the work of the U. S. Entomological Commission and of the U. S. Department of Agriculture have thus been potent in the development both of insecticides and of insecticide appliances, many important advances have come from private enterprise. Necessity here, as elsewhere, is the mother of invention, and while all countries have acknowledged American leadership in this field, many of the most ingenious insecticide machines have been produced abroad. Admirable pumps for the subterranean injection of insecticides against the grape phylloxera and other root-inhabiting forms have been devised in France as the result of special need, and the whole class of knapsack-pumps for vineyard use has reached a high development in France and Italy. Although mainly directed for late years against fungi, they are admirably adapted to the spraying of insecticides in the vineyard and upon other low-growing crops. America alone, however, has seen any considerable degree of development of horse-power sprayers for field crops, although the recently invented "Strawsonizer" of England is an excellent machine for this purpose, barring its considerable cost.

In this field of work the official entomologist cannot afford to antagonize private enterprise; indeed, he may well assist it. Competition among manufacturers will soon reduce prices to an economical basis, although at the present time they are in some instances absurdly high. There will always be some difficulty in having a machine, invented by an official and unprotected by letters patent, manufactured for the trade. The old saying "What is everyone's business is no one's business" applies here. There are some 24 firms now manufacturing insecticide apparatus in the United States to-day, and the number is constantly on the increase. Many of the manufactures are essentially the same as, or but slight modifications of, those first described and recommended by official entomologists who have been unable or unwilling to put their discoveries to commercial account. The economic entomologist points out the want and the means of meeting it; the cultivator creates the demand and the manufacturer supplies it.

To conclude: As one of the immediate results of the great increase in the number of paid entomologists who are able to devote all or nearly all of their time to the work, consequent on the recent establishment of the State Experiment Stations, we may expect, after a little preliminary repetition of previously known facts and remedies in the interest of accessibility, great advance along the lines of our first category. Our knowledge of the life-histories and habits of all plant-destroying pests should take great and immediate strides, and, as I have shown, new preventives and remedies will undoubtedly result from the establishing of new facts of this character. Progress in the second and third categories will be much slower. Yet we may confidently anticipate advance in the cheapening of insecticides, and in better knowledge of their properties and the conditions governing their application. We may as confidently look for cheaper and better apparatus, though radical and important discoveries in this direction are hardly to be anticipated, however much hoped for.

C. V. Riley.

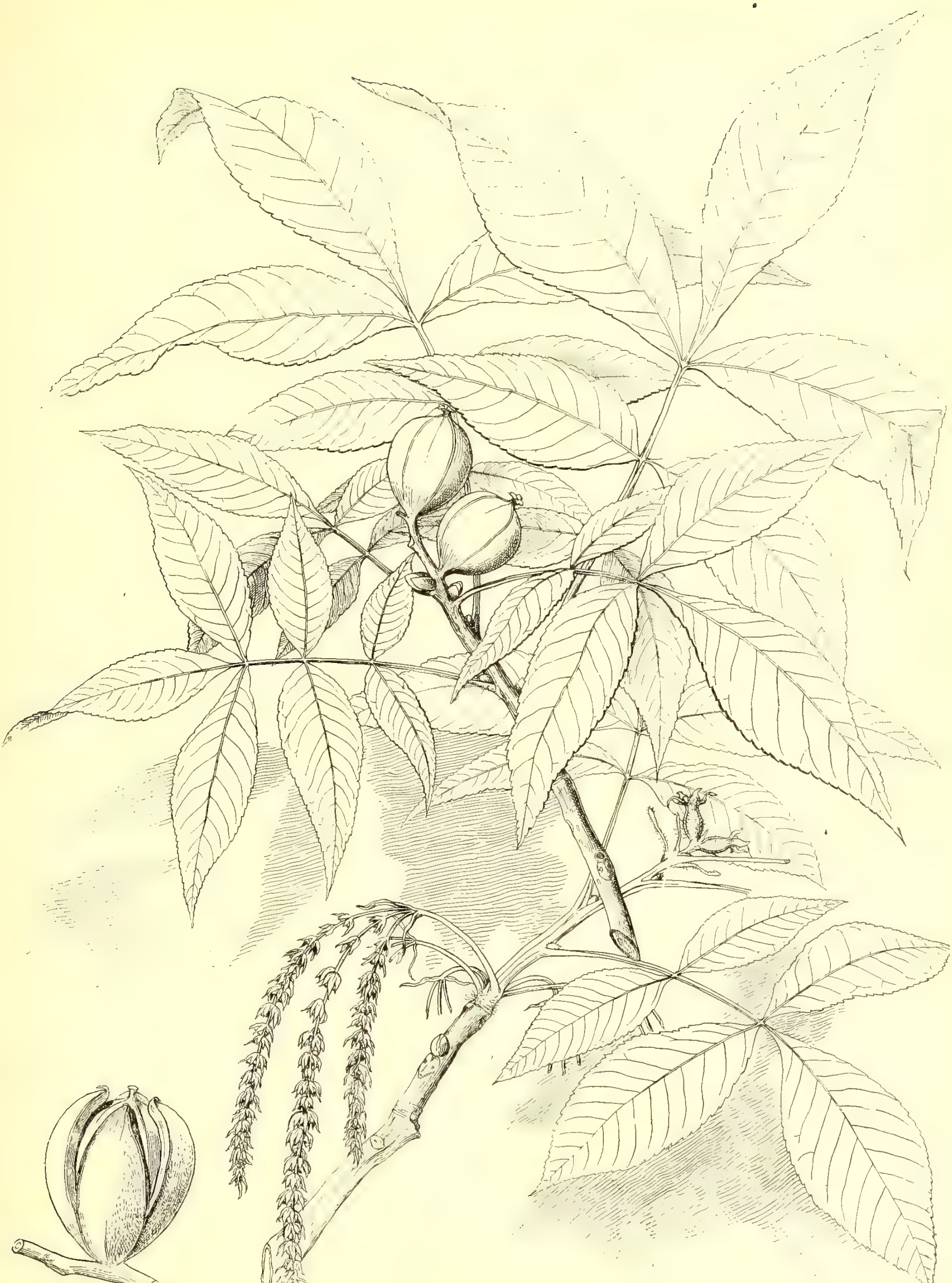

Fig. 2. False Shag-bark Hickory (*Hicoria microcarpa*)

FALSE SHAG-BARK HICKORY (*Hicoria microcarpa*).

Hicoria microcarpa, Britton, Bull. Torr. Bot. Club, xv. 283 (1888). *Carya microcarpa*, Nuttall, Geneva N. Amer. Pl. ii. 221 (1818).

THE False Shag-bark Hickory is a tree which is very imperfectly understood by botanists, and one rarely recognized by others. Some botanists have even doubted its existence, and our highest authority upon American trees has considered it but an incidental form of the true shag-bark. This confusion has evidently resulted mostly from scant and imperfect specimens in the herbaria of botanists. The writer has long observed the tree in central Michigan, and more recently in central New York, and it appears to possess certain marks which clearly distinguish it from other species.

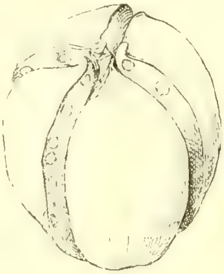
FIG. 4. NUT OF SHAG-BARK.

It is important that horticulturists should obtain a correct understanding of this tree, for it is often mistaken for the shag-bark hickory, and now that nut-culture is assuming some importance such confusion should not exist. The hickories are also among our most picturesque trees for planting in large grounds. The ornamental features of these two species are very unlike.

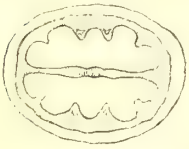
FIG. 5. CROSS SECTION OF NUT OF FALSE SHAG-BARK.

The false shag-bark is more closely related to the pig-nut than to the shag-bark or white hickory, but it agrees with the true shag-bark in possessing a loose bark, and in the disposition of the husks of the nuts to split open at maturity. It may therefore be well to first contrast it with the shag-bark, with which it appears to have been generally confounded.

The first, and perhaps most striking difference between the false and true shag-barks is in the habit of growth. Figures 1 and 3* show characteristic specimens of each. The false shag-bark usually has a narrower top than the other. Its lower and intermediate branches take a nearly horizontal position, and the spray is so disposed that it falls in layers or strata. The shag-bark, on the other hand, is a rugged and broken grower, and is therefore more picturesque. It is in every way a bolder tree. The spray is coarse and somewhat sparse, and it breaks up into angular and irregular figures.

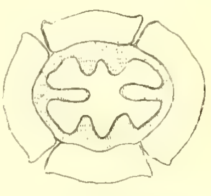
FIG. 6. CROSS SECTION OF NUT OF SHAG-BARK.

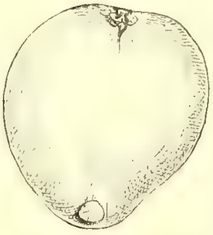
FIG. 7. PIG-NUT.

The bark of the two species is dissimilar. In the false shag-bark it breaks up into thin strips from one to three inches wide, while in the other it breaks into wide and flat plates, which are often six inches broad. Figures 10 and 11 bring out these differences. This dissimilarity of bark is so great as to enable one to distinguish the species at a glance.

The winter buds of the two are strikingly unlike. Figure 8 shows a representative twig of the false shag-bark, and figure 9 one of the shag-bark. The difference does not reside entirely in the sizes of the buds. The bud-scales of the shag-bark are conspicuously pointed, while those of the other are blunt or nearly so. These differences are most apparent when the bud-scales begin to enlarge with the bursting of the leaves. Those of the shag-bark are then very broad, and are terminated by a prominent point often a fourth inch or more long. Those of the false shag-bark are much narrower and obtuse, or bearing only a rudimentary point.

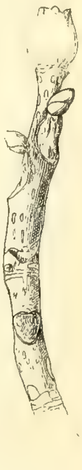
FIG. 8. SHOOT OF FALSE SHAG-BARK.

FIG. 9. SHOOT OF SHAG-BARK.

There are differences between the two in foliage and season of flowering (the catkins of the false shag-bark appear fully a week after those of the other species), and the catkins

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* The negative from which a "half-tone" illustration of the shag-bark was to have been made, was broken in transportation; but the artist has made a faithful tracing of the form and habit of the tree on page 387.—ED.

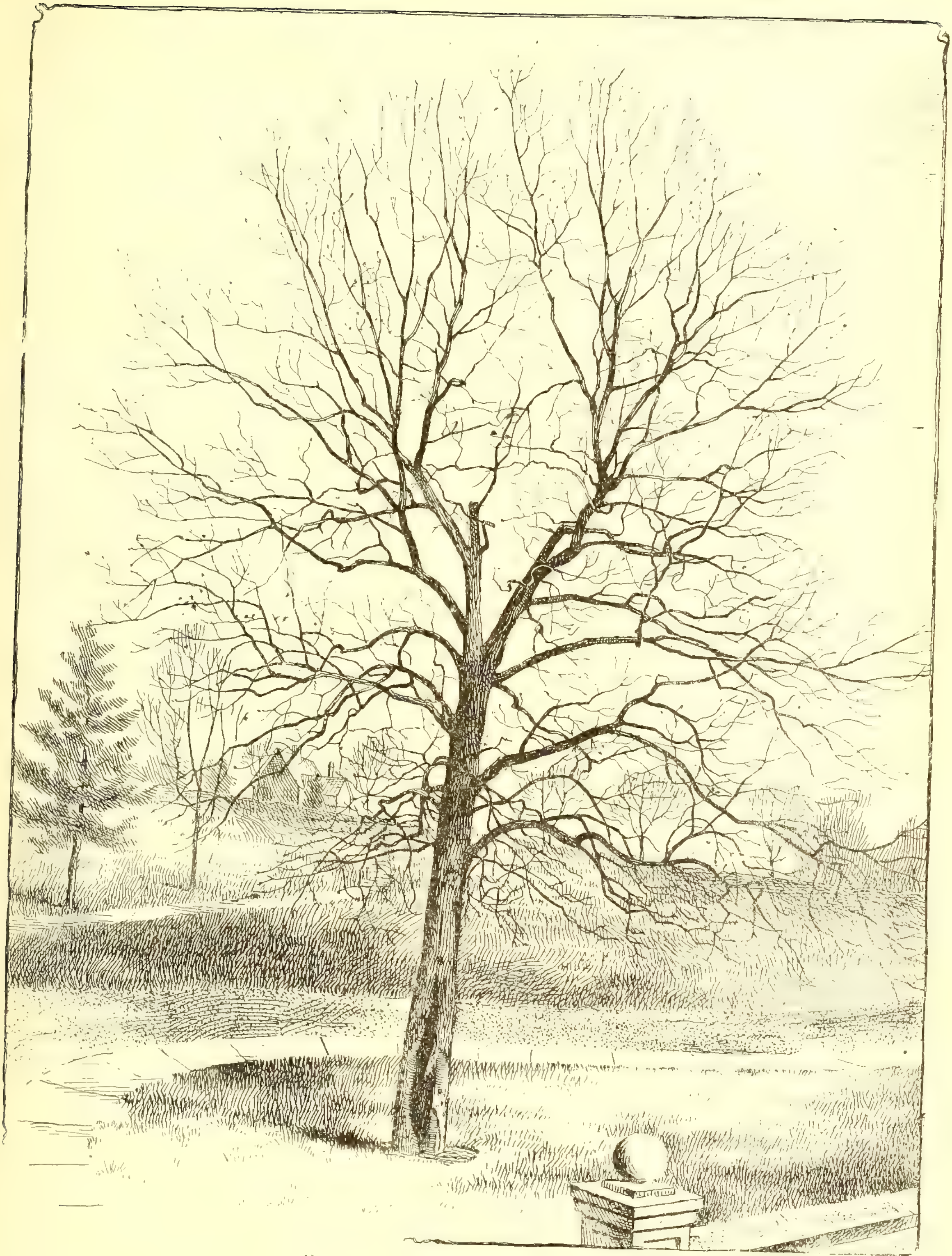

Fig. 3. The Shag-Bark Hickory.

of the false shag-bark are slimmer and bear hairy anthers, while the others are smooth, but these dissimilarities need not be discussed here.

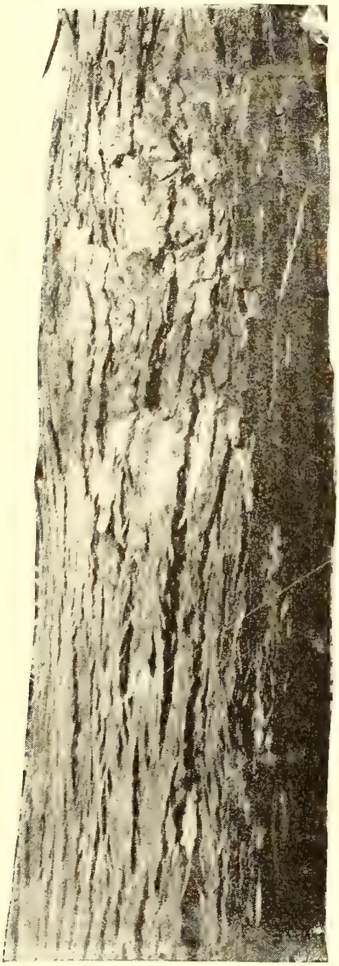

Fig. 10. Section of Trunk of False Shag-bark.

The most characteristic differences are found in the nuts. The husks and nut-walls of the false shag-bark are very thin, and the husks rarely split off entirely, but the divisions cling together on their lower portions. The mature nut in figure 2 is an admirable representation, and figure 5 is an illustration of a characteristic cross-section of a nut with its husk. The nut of this species is more conspicuously beaked than that of the other species. The husks and nut-walls of the true shag-bark are very thick and heavy, and the four divisions of the husk break away entirely and leave the nut free. Figures 4 and 6 show these peculiarities. These features of the fruits are so striking that they at once clearly separate the species. The nut of the false shag-bark is sweet and edible, but it is nevertheless inferior to that of the shag-bark, and all who desire to plant hickory trees should be able to distinguish the two.

The thinness of the husk of the false shag-bark and its disposition to split only part way down, allies this species to the pig-nut (*Carya porcina* of botanies); and, in fact, closer observation is required to distinguish these two than those previously discussed. But the fruit of the pig-nut is unmistakable. It is pear-shaped—reminding one strongly of a Seckel pear; it lacks the point of the other; the tip looks like the "eye" or calyx of a little pear. Is much less ridged, and the husk does not split off. It is now the last of May, but I have to-day gathered the last year's nuts of the pig-nut and the husks are still firm, although some of them have cracked for a third or half their length. But even when the husks crack, the divisions remain firmly appressed to the nut, and never become loose as in the case of the false shag-bark. The husks are also thicker. The meat is acrid and inedible. The smooth, regular, compact, pear-like nuts at once distinguish this species. Figure 7 is a faithful illustration of the fruit of the pig-nut. The nut itself—after the husk is removed—is slightly retuse or hollowed at the top, and the point is very small. The nut of the false shag-bark, on the other hand, is nearly or quite full on top, and the beak is prominent.

There are other points in which the pig-nut differs from the false shag-bark. The most striking difference lies in the bark, which is close, furrowed much like a bass-wood, and is never shaggy, so far as I have observed.

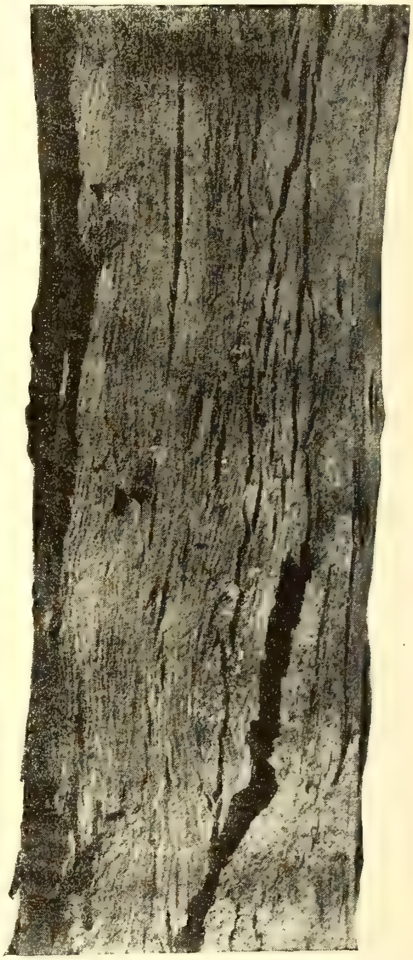

Fig. 11. Section of Trunk of Shag-bark.

It has seemed necessary to go somewhat into detail in the description of these hickories, as they have never been fully and properly characterized. On account of unreliable field data, it is impossible to determine the distribution of the false shag-bark. It evidently occurs from New York to Illinois, and south to Delaware. I have observed it to be a common tree in some places. The pig-nut has a wider range, growing from Maine to Minnesota, and southward to Florida and Texas. The true shag-bark has much the same range as the pig-nut. All three species grow in sight from my window.

A singular confirmation of the specific distinctness of the false and true shag-barks is found in the behavior of a certain disease or injury which attacks one species and not the other. This is a swelling which very closely resembles the plum-knot, and which attacks the young branches of the shag-bark. A few steps from my door is a shag-bark which is badly infested, while two false shag-barks whose branches touch or interlock with the other are not injured. If this distortion of the branches of the shag-bark should become common, it would interfere seriously with the use of the tree for ornamental purposes.*

The botanical names of the hickories have recently undergone a complete metamorphosis. The genus *carya* by which these trees are commonly known, was founded by Thomas Nuttall in 1818. But it now transpires that Rafinesque in 1808, and again in 1817, proposed the name *hicoria*, a Latinized form of the aboriginal name. As Rafinesque's name is clearly the older, it must supplant carya. Professor Britton has recently arranged the species under hicoria, and although he has made some unnecessary and unfortunate changes in the specific or "given" names, they must be adopted. The shag-bark is now called *Hicoria ovata* (formerly *Carya alba*), and the pig-nut is *Hicoria glabra* (formerly *Carya porcina*). The mocker-nut (formerly *Carya tomentosa*) becomes *Hicoria alba*. The specific name of the false shag-bark, *microcarpa*, means "small-fruited," and it was evidently given to record a distinguishing mark between this species and the shag-bark. But while the nuts of the shag-bark are usually larger, they are very variable, and often as small as those of the small-fruited species.

The common names of the species need correction and limitation. All the hicorias are properly hickories, but in many parts of the east they are called "walnuts," the shag-bark being known as "white walnut." These names are misnomers, for the term walnut properly belongs to the genus juglans, which includes the black walnut and butternut.

L. H. B.

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*Recent examination shows that this distortion is due to the work of an insect.—ED.

SPRING IN CALIFORNIA.

> "Thus came the lovely spring, with a rush of blossoms
> And music;
> Flooding the earth with flowers and the air with melodies
> Vernal."

IN THE Golden state, the advent of spring time is less gradual than on the snow-bound Atlantic shores. Early in the year, the genial sun shining upon the rain-soaked earth, calls up the fresh, young grass to re-carpet hill, meadow and wayside. The air is full of anticipation. Upon slopes exposed to the ocean breeze, flourish the wild blue iris, the lupin and the yellow pansy.

In the bustling metropolis, the stranger pauses at the street corner to purchase a bunch of fragrant Russian violets or mignonette; and "the little birds sit on the telegraph wires, and chitter and flitter and fold their wings."

By the end of March every garden, worthy of the name, is a veritable bower; sweet with lilac-plumes, hawthorn and jasmine; beautiful with great clumps of calla-lilies, beds of velvety German pansies, variegated verbenas, and blue forget-me-nots; or gay with hyacinths, daffodils, flame-colored tulips and camellias.

First to break the rich brown soil are the crocuses, jonquils, snowdrops and lily of the valley; and these are soon followed by the cowslips, primroses and the polyanthus. Very spring-like appear the leafless, blossom laden boughs of the bridal-rose, flowering quince and double buttercup.*

The climbing rose vines, that all winter long have been battling with the elements, put forth a wild luxuriance of bloom and fragrance; from the porch roof, the wistaria flings down a multitude of graceful, drooping clusters; while fair rosamond, gold of ophir and tea roses vie with each other in size and quality. Upon smoothly-shaven lawns, the polished leaves of the magnolia rustle in the soft spring winds, in company with the fan-palm, and the banana tree.

With the pink and white of the apple blossoms, the snow-drifts of the cherry trees, and the coral red of the quince blossoms—a fairy scene indeed—are now the fruit orchards, a short time since so bare and lifeless. In the southern part of the state, the atmosphere for miles around is filled with "the odors of a thousand weddings," from the vast orange-groves.

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*Stately Easter lilies rise in season to commemorate the Ascension.

Fields of tender wheat are springing in the open country; and against a dark background of live oaks, evergreens and eucalyptus appear, in refreshing contrast, the expanding boughs of the silver poplar, flowering acacia, locusts, pussy-willow, and other deciduous trees or shrubs.

In the woods the pines are budding, and fir-tips are doffing their little brown caps, liberating the delicate fir-tassel. The madrona sheds its winter overcoat of bark; and laurel, buckeye, elder, hazelnut and manzinita all show signs of re-animation.

Upon the sodden forest floor, strewn with last year's leaves, the sunshine slants through on a wild tangle of undergrowth—dog-wood, waxberry bushes, blossoming blackberry vines, wormwood, sweetbriar and the beautiful but treacherous poison-oak; while trailing ivy and grape vines twist themselves around the trunks of lofty trees, triumphantly waving from the top-most branches.

In the humid atmosphere of the booming creeks, we find the bulrush and the trillium, with hosts of sweet smelling brakes, and many tiny uncurling fronds of gold or silver-back ferns, five-finger ferns and dainty maiden-hair, and snugly lodged in crevices of neighboring rocks, the fragrant yerba-buena vine.

Emerging from the shadow of the woods, the eye is attracted by what at first appears a solid patch of sunshine, but which, upon nearer investigation, proves to be field after field of eschscholtzias, the orange-colored California poppy. Wading through the tall clover, we break off the succulent stems by the armful, or bear away the roots and all. One might fill a wagon, and they would hardly be missed. Scarcely less numerous are the shiny faces of the saucy butter-cups, and the slender stalks of the blue-bells. Here also are acres of nodding wild-mustard and the white wild-turnip blossom; and across the emerald alfalfa fields, like a quiet lake, in the distance, are the nemophilæ or baby-eyes.

To the traveler borne along by the rushing locomotive, the country seems one vast fantastic checker-board. While little black clouds chase each other over the April sky, and silence is broken only by the merry whistle of the plowman or the liquid note of the meadow-lark, darting from its hidden nest, over field and hillside the botanist may delightedly wander, tracing the mysteries of plant growth in the mariposa lily, soldier's cap, shooting star, cream-cup, monkey-flower, evening-primrose, buffalo-clover and rattle-snake grass; thus drawing nearer, day by day, to the mighty source of the humblest life.

"And nature, the old nurse,
Took the child upon her knee,
Saying, here is a story-book,
Thy Father has written for thee."

* * * * * * * * *

Alameda Co., Cal. BERTHA F. HERRICK.

FRUIT GROWING IN CANADA.

As your readers are no doubt fully aware, the subject of fruit-growing is taking a deep and strengthening root among us, and bids fair to overshadow other industries. Its growing importance is being felt and realized in our individual and commercial affairs, controlling and directing them to such an extent that we are becoming somewhat noted, even abroad, as a fruit-growing country. If your readers could be present at the great wharfs and stations of our central markets, say in strawberry or raspberry time, or, better, in peach, grape or apple time, they would almost be compelled to conclude that the resources of wide areas of fertile lands were being taxed to supply the immense demands upon them.

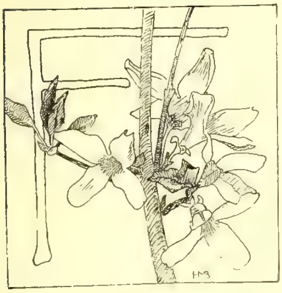
Even in our smallest country towns and villages, the supply and demand is annually increasing and every little plot of fertile Canadian soil is made to do duty in contributing its quota.

In this matter, some locations of our country are by far more favored then others, and some parts are adapted to special kinds. For example, the Niagara district has long been noted for its abundance and fine quality of peaches and grapes; the Oakville region again for its abundance of fine strawberries and peaches; the Arkona region is becoming noted for its beautiful strawberries, raspberries, peaches and grapes, and the whole county of Lambton for the finest developed apples.

We have great plenty of very favorable locations for producing the most beautiful grapes in great quantity. We flatter ourselves that no country can produce finer, larger, or better grapes than those produced in the famed Niagara district of Ontario and the Arkona district, and that known as the Chatham district on Lake Erie. The products of grapes in these locations are enormous. The sorts mostly grown are Concord, perhaps two-thirds of the whole, and the remainder are Worden, Moore's Early, Rogers' No. 4, No. 9, Delaware and a few of the best whites, but the whites are not favored in our markets. This industry is likely to assume very large proportions. B. G.

Arkona, Ontario.

A MODEL WORKSHOP AND SOME USEFUL ARTICLES.



FEW cultivators appear to realize the value of a convenient workshop close at hand, in which to do the many little jobs of mechanical work so often needed. There are always articles getting out of repair, and frequently the delay in taking them to a mechanic, or the loss from doing without them when needed, amount to much more than the cost of having them fixed. If a convenient place, with a few ordinary tools is at hand, most of these things may be done at home with but little loss of time; or at least a temporary substitute provided, until a suitable time to have it done more satisfactorily.

Besides this, there are many little conveniences which one who is willing to give the matter some thought, may provide for use about the place or in the house. It is safe to say that the stormy days used in making things of this kind will prove more satisfactory than those spent about the village store or other lounging places.

The farm on which the shop described is located, is remarkable for the number of things of this kind to be found. It is also very noticeable how well the owner, who is well advanced in years, is enabled to carry on his work, and at the same time, how many leisure hours he finds to read his papers and enjoy the comforts of life. At every turn about the house, the barn, smaller buildings or farm, are to be found tools or fixtures, the cost of which was little or nothing, aside from the time expended in making them, and this usually applied when least valuable.

The workshop, a ground plan of which is shown in Fig. 1, has served as a factory from which nearly all these appliances have sprung. It is simply a cheap frame building 16x24 feet, boarded and battened, with an upper story high enough to be convenient for storing lumber or other things. At *A* sets a high block with an iron or steel wedge driven into the end (Fig. 2); something solid on which to do riveting, and all sorts of pounding, is always wanted. This answers the purpose admirably, making a first-rate anvil for farmer's use. *B* is a cheap board bench which catches all the extra nuts, bolts and other pieces of iron which accumulate. It is not very attractive in appearance, but has its place, and quite an important one too, for often just such a piece as is wanted can be here picked up and a trip and fee to the blacksmith saved. A few new bolts, rivets, etc., are kept ready for use when occasion requires. Any piece of timber which has been split may often be neatly repaired by putting one or two bolts through it. Over the bench are shelves for bits, drills, etc.

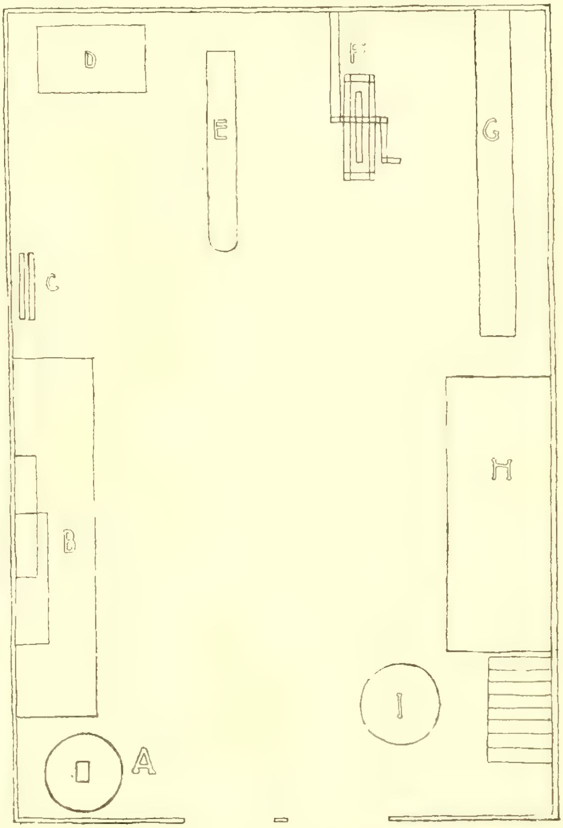


FIG. 1. PLAN OF MY WORKSHOP.

A little ingenuity in working metal is always serviceable and will lead the way out of many difficulties. If a hole is needed through any light piece of iron, a device similar to that shown in Fig. 3 will greatly aid in drilling it. The cradle finger broken out in the heavy lodged grain last fall is just what is wanted, if you have saved it. Bore a hole near each end, and fasten a piece of strong small rope in the small end. Next, an old file ground off at the end and fastened in a large spool, like those used for chalk-lines, or something of similar shape, is needed. Give the rope one turn around this, run it through the hole in the other end of the stick and draw it as tight as possible, wrapping it two or three times around to aid in holding it. Then take a piece of iron or block with some sort of a rounded point, with which to press against the end of the spool, so that it can turn readily, and you have a very satisfactory drill which will make a hole much quicker than you might imagine. Each time the stick is moved back and forth the length of the rope, it gives a good many turns of the file, which, of course, cuts just as well one way as the other. It is but a step to the grindstone to grind down the file as often as it gets too dull.

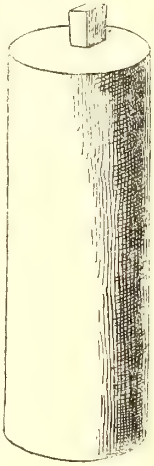


FIG. 2.

Of course, no enterprising man wants to run to a mechanic every time his saw needs filing, so he will want a saw clamp, and it may be cheaper to make one like that shown in Fig. 4 than to buy. One upright scantling is securely fastened to the floor and girt in front a window. The other is mortised to allow it to play on the cross piece. A wedge-shaped piece of board works in a slot in this cross-piece to fasten the clamp, which is simply two narrow strips of board with the upper edges beveled, and held together at one end by a screw. One board is shown dropped down in the cut.

At *D* sets a tool chest, *E* shave-horse, *F* grindstone; *G* is a turning-lathe, run by foot and connected with a large balance wheel on the upper floor; *H* work-bench, *I* hewing block.

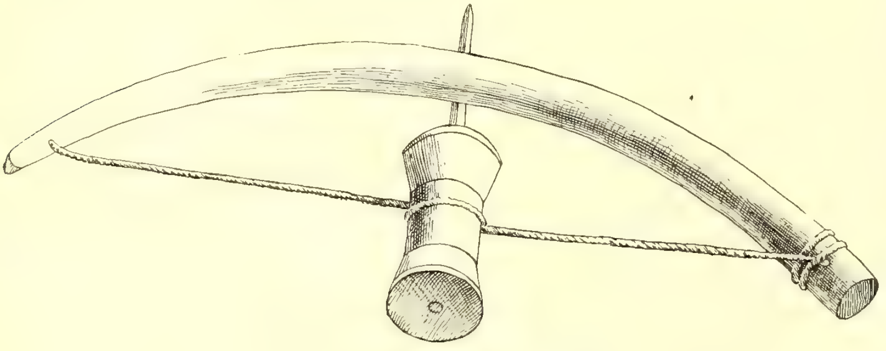


FIG. 3. DRILL FOR BORING METALS.

The building affords an excellent place to keep small tools of all kinds for both outside and inside work, aside from its value as a place for work. The sides are well filled with nails, hooks and pegs which serve as places for all sorts of garden and farm tools, as well as those for shop work. The room under the benches and overhead is used as a place in which to keep a little lumber, and such odds and ends as are left from time to time. It costs nothing to let these lie there and they frequently furnish just the piece that is wanted.

As an instance, the owner mentioned using a piece the past winter, which he felt certain had been there over 25 years, and at last the place came for which it was exactly the right thing! Some might question the policy of saving a thing of that kind for use 25 years hence, but there should always be some stock of material on hand, and no doubt most of it finds its use much sooner than this. In this particular case, the shop was built before the dwelling, and rendered excellent service as a place in which to work out finishing material for the house, for it was in the days when wood-working machinery was not so plenty as now, and most of the work had to be done by hand.

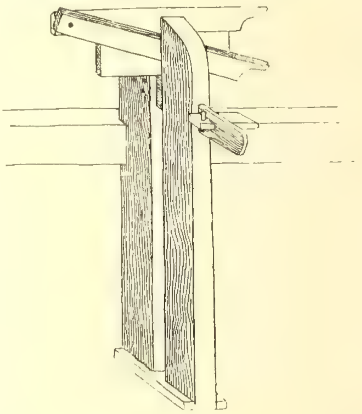


FIG. 4.

Fig. 5 shows a grater which possesses some advantage over the common board leveler for certain kinds of work. It can be made from an old stone-boat which has become so worn that it cannot be expected to last much longer, using strong spikes of some kind, standing backward, for the teeth. Those in the one illustrated are old teeth from a threshing machine cylinder. Any stones or rubbish which need to be removed from the field may be thrown on the boat and drawn along until it is convenient to unload them. The weight of these, together with that of the boat, will hold the lumps in place so that they are more effectually ground by the teeth. The driver will usually be willing to ride if the weight is not sufficient without. If a boat were to be made especially for the purpose, it would be better to have it wider than a common stone-boat, in order to accomplish more work and cover the tracks made by the horses' feet.

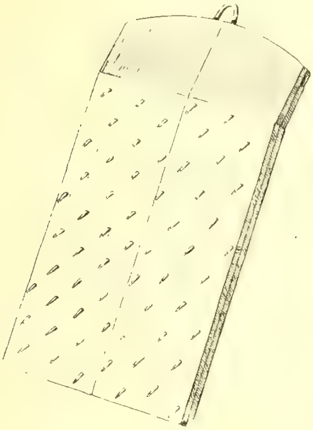


Fig. 5.

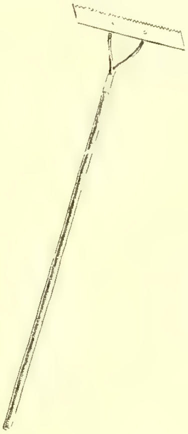


Fig. 7.

Fig. 6 represents a stone-fork, an exceedingly useful tool, and which deserves a wider reputation. Manufacturers would be rendering good service to put such a fork generally on the market. It is made with six short, heavy tines, close together, and is very convenient in throwing small stones, corn-stubbles, cabbage stumps, or any sort of rubbish on to a wagon or boat in clearing ground for a fine crop. One active man with such a fork in his hands to throw out the loose stones can often do more to improve the public road than a gang of men and teams with plows and scrapers will do in double the time.

At Fig. 7 is shown a small garden hoe made from a piece of old buck-saw, to which is riveted a pronged shank, which any blacksmith can readily make. This is very useful among small plants in soft ground. It is not only light and convenient, but the teeth are also an aid in cutting weeds close to the plants.

Fig. 8 illustrates a device for dropping seeds, which is of more interest to the elderly men who find it hard to stoop down and work. The part reaching the ground, which is fitted into the bottom of the box, is made of two strips of wood grooved out on one side and fastened together, forming a tube through which the seed drops. Carrying the tool in the hand, the number of seeds that are wanted in a hill is pushed in with the thumb, which remains over the opening, preventing the escape of more seeds till the next hill is reached. The covering is usually done with the foot. This tool was devised before the introduction of the patent corn planters, now so common, and which largely take its place. One advantage which it has over them is that it can be used for small seeds of any kind wanted in hills, as well as for large ones.

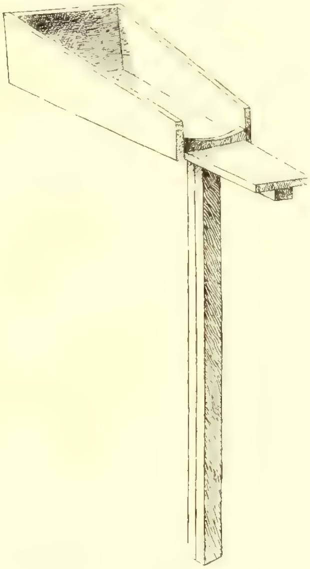


Fig. 8.

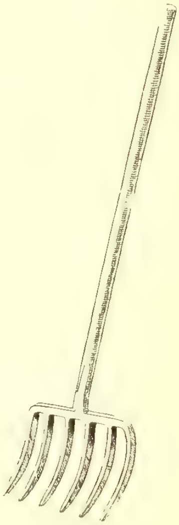


Fig. 6.

Pennsylvania. FRED W. CARD.

* * *

A landskip, for instance, is always irregular; and to use regularity in painting, or gardening, would make our work unnatural ond disagreeable.

—SHENSTONE.

QUALITY AND QUANTITY.

AN AMATEUR'S EXPERIENCE WITH FRUITS, AND A QUERY OF THE FUTURE.

FRUITS have always been my first love. As a boy, I drew mental pictures of the orchards and small fruits and arbors I should have when old enough to shift for myself. Everything should be neat and attractive, even artistic. Every plant should be pruned, trained and tilled in the most approved methods.

Of course, the means of paying for all this was no part of my thoughts in my youthful days, and when I finally came to do for myself, I was possessed of a great ambition for a model little farm, without any definite purpose as to how I should get the money to make it. Still I thought that good fruits, better than any which my neighbors grew, would somehow find a remunerative market. I had been encouraged in this idea by the lectures of various teachers and the constant advice of the best rural papers.

My first fruits to come into bearing were strawberries. I had a beautiful patch of Triomphe and a fair one of Jucunda. I had given them unusual attention, as one must do if he secures a good crop of these coquettish varieties. The crop was a good one, and I naturally felt proud of my success. I put up the berries in "honest quarts," and had neat little slips printed for each box, saying that the contents were warranted to be strictly first-class. I recollect vividly the smile of incredulity which passed over the grocer's face as I took in my first picking, and told him that I expected a better price than was paid for ordinary berries.

"Here are berries just as big as yours," he said, "and how can I ask more for yours than for these ?" "But those berries are Wilsons," I replied, "and mine are Triomphes, and much better." "No one asks about the taste of strawberries," he retorted; "a strawberry is a strawberry, and no one cares anything about the name of it. Those are just as big and red as yours, and ought to bring just as much." "But," I said, "those berries are in snide quarts, and my boxes are full quarts. My boxes are a full fifth larger than those and ought to bring more." "I don't care anything about the size of the box," he continued; "a box is a box and no one asks how much it holds." "But can't I leave my berries and let them sell for what they will bring ?" "Not unless you take them tags off. I can't make any discriminations. Smith supplies me with berries which suit my customers, and I don't want to bother with any high-toned notions."

So my aspirations fell. I was sure that there were some people in the village who would be willing to pay me an extra price for my berries, but how I should reach them I could not tell. I tried the other grocerymen in the village, but with about the same results. I left my first picking with the last dealer whom I visited. When I next called upon him I found that he had allowed my berries to stand out in the broiling sun, and the label became a farce. The result was, that I put my berries upon the market as my neighbors did, and my fine Triomphes sold as Wilson and Captain Jack. Of course, I was discouraged, and it was but natural that I should plow up my patches and plant less exacting varieties. Fortunately, however, I retained a small corner of my favorite Triomphe bed, and this eventually solved my difficulties.

Two years had passed, and I had fallen into common ways of growing the commonest things. In fact, I began to think of giving up the business, for I found little to interest me in such loose and thoughtless practices. At this critical point a little circumstance diverted the current of my thoughts. A couple friends from a Massachusetts city were visit-visiting us; they were thoroughly in sympathy with the freeness and openness of the country, and used to make careful and critical examinations of my trees and fruits. It chanced that the corner of the old Triomphe bed still persisted, and this year the berries, though not large, seemed to be unusually rich and delicious. I have often noticed this tendency in some old plants to bear delicious fruits, as if the sweetness of a warm and mellow old age had come upon them. My friends chanced upon this patch in one of their morning rambles, and they could scarcely find adjectives enough to express their admiration of the berries.

"If you could send such berries as those to Boston or Hartford," they exclaimed, "you could make your fortune." I told them of my experience, and declared that the venture would not pay. But they persisted that they were right, and I soon found myself wondering why I had not thought of the metropolitan markets before. They declared that my troubles had been with the dealers, and not with my idea of growing superior fruits. If I could but find the right dealer, they said, I could sell my choice fruits at a good price; and they advised me to revise my first warranty ticket.

I resolved to try, and by their aid I obtained the addresses of several good firms in neighboring cities. My first trial in these new markets was with some fine raspberries, a small consignment of a dozen packages, which I put up with extra care. The day after I shipped them I received a telegram from the dealer, asking if I had more berries of the same kind! This was a surprise and a revelation, and it gave me new spirits.

Two years more have passed and have brought me to the point where the reader now finds me. I am now gradually returning to my first idea of the best varieties, the best culture and the greatest care. It appears as if there is a sufficient demand for quality to pay for securing it. Of course, I have made many mistakes during these last two years, but they have all been useful to me. I am finding myself more intimately interested in my business and more appreciative of nature than I had been under the thoughtless system of a few years ago. I begin to see more to admire and to study. The fields and plants seem to speak to me. I am beginning to feel what a delightful life must be that of the experimenter, for he converses with nature in the most intimate way.

I do not know that there is a fortune in fine fruits, as my friends declared, but I am coming to feel that there is more money in them under many conditions, than in the cheaper products which most of my neighbors grow. And there is certainly money made by care and tastefulness in packing. A single illustration will emphasize this point. The line between myself and my neighbor runs through an old orchard of Hubbardstons. My neighbor cares more for stock than for fruit, and he sold his Hubbardstons a year or two ago for about a dollar a barrel. I sold mine, which were in no way superior, for from $2 to $3.

Perhaps my faith in quality *vs.* quantity is too strong, but I am determined to work along this line, not only with small fruits, but with apples and pears. I shall feel my way, to be sure. But I cannot retrench, for I had rather go out of the business than to return to the old way. I cannot read THE AMERICAN GARDEN and other horticultural periodicals and then practice loose methods. But others have had better experience than I; what do they say as to my prospects? Am I on the right track for the best success to be won?

Connecticut. I. C. Y.

APPLE TREES OF GREAT SIZE.

Measurements of an apple tree of extraordinary size have been furnished by Rev. A. Swartz, Lancaster, Ohio, to the Pittsburgh *National Stockman and Farmer*. The circumference of the trunk three feet above the ground is nine feet five inches, as measured by Mr. Swartz; and the spread of the branches is thirty-five feet on each side—seventy feet. The tree is considered to be a seedling, with fruit resembling Maiden's Blush in appearance, quality and time of ripening, and might be taken for Maiden's Blush, only that Mr. Swartz is an excellent judge of fruit. The crop in 1888 was thought to be well up toward a hundred bushels. The tree stands on the premises of Henry Ammon, Liberty township, Fairfield county, Ohio.

This account by Mr. Swartz has called forth two others in a subsequent issue of the *Stockman and Farmer;* the first from Wm. Musser, of Wayne county, Ohio, and the second from S. B. Oakes, of Washington county, Ohio.

Mr. Musser's tree measures ten feet four inches in circumference at one foot from the ground, and nine feet ten and one-half inches at a height of four feet. It is standing on the farm formerly owned by Jacob Tracy, having been brought from Pennsylvania as a two-year old seedling, and planted by Mr. Tracy's father seventy-four years ago.

Mr. Oakes' tree stands near the bank of the Ohio river, where it was planted in 1791 or '92. The circumference of the trunk at the smallest place is twelve feet two inches. It has five principal branches, the largest of which has a circumference of seven feet, and the smallest three feet. This is probably the largest apple tree in the United States if not in the world. It is a seedling and bears well, and the fruit—a large yellow apple, in season from the middle of July to September—is said to be superior to Russet, Belleflower, etc., for cooking. This is high praise; but Mr. Oakes, living as he does in the vicinity of the old Putnam nursery and orchards—the first established in Ohio—writes understandingly. R. J. B.

REFRIGERATOR CARS AND COLD STORAGE FOR FRUITS.

THE value of artificial cold air, as applied to refrigerator cars, cold storage warehouses, residences and other purposes, can not be too highly appreciated. The subject has not received the attention to which it is entitled, in comparison with the attention given the improvements in some other industries, the importance of which, as compared with cold storage is insignificant. I believe that the methods and appliances of cold storage are still in their infancy, and that each year will bring forth new and important developments. But a few years ago, the man who would have put forth the idea of dressing beef in the west and transporting it to Europe, would have been considered erratic. The same can be said of sending dressed meats from the west to New Orleans, Charleston, Savannah and other points in the warm climates. The refrigerator car bears the same relation to perishable fruits and vegetables as it does to dressed beef. Through its agency the most delicate southern fruits are brought to our markets in prime order, tempting to the eye, and palatable. It has proved a valuable adjunct to trade. Many industries are in existence, many laborers are employed, and many luxuries are enjoyed because of its use. The strawberry industry of Florida depends entirely upon it. In fact, the small fruit industries of the whole country are deeply indebted to it.

Through the use of refrigerator cars the cost of transportation has been materially reduced, as is also a large percentage of loss, which is quite certain to take place through other means of transportation. It is a fact, that in localities where refrigerator cars are in use for the carrying of fruits, staple prices prevail. Here in Oswego, where for many years the strawberry industry has been one of our most important agricultural interests, it was, for want of proper transportation facilities, on the point of decay. But the officials of the Lehigh Valley and the Rome, Watertown & Ogdensburg railroads saw that with proper facilities it might be nursed into a large and paying business for them, and accordingly, these railroads put on a line of refrigerator cars, made reasonable rates of transportation, placed the berries in the markets on time and in good order—so much so, that since the line was brought into use there has not been a single claim for loss. The result of this was to give a new impetus to the business. It has caused a five-fold increase in the acreage of strawberries about here in as many years, and still we are not growing as many berries as we can sell at profitable prices. It has also been a great aid in the shipment of pears. In fact, it has been the important factor in opening up the western markets for our Bartletts.

I have, perhaps, spoken too much at length of refrigerator cars; but I have done so because I consider them more important to shippers and growers than cold storage warehouses, for the reason that nearly all fruits sell best in their natural season. To hold back any considerable portion of the crop, in a locality where large quantities are grown, would, I believe, prove disastrous five times out of six. I have always contended that the time to sell an article is when there is a demand for it. I have pursued this course, and have found it profitable. Cold storage warehouses, in many cases, are a necessity, however, particularly in large cities, where vast amounts of perishable matter are received daily, and which is liable at times to overstock the markets, and materially depress prices. It can also be of great benefit where large amounts of fruit are grown, as it often occurs that by holding shipments a few days a bad market may be avoided.

The safest plan to pursue for an individual or firm, in managing cold storage, is to put away none but the best fruit; hold until the more ordinary grades are out of market, and then send it forward in such quantities as the markets will take at a profit. Of course, what I may say in the matter of holding and marketing are of little importance in the general management of the business. That depends wholly on the good judgment of the operator, coupled with experience.

I have examined many methods of cold storage, and I consider the "Wicks patent" the most desirable, for several reasons. 1st. Where a refrigerator is not run the season through, it is more economical of ice. 2nd. The ice chamber takes up little room and is on the same floor as the cooling room; consequently a less expensive building is required. I have a refrigerator with a capacity of three thousand barrels, constructed according to my own ideas, and it answers all purposes. But if I were to build another I would adopt the Wicks patent.

The kinds of fruits which keep best in cold storage are apples, pears, strawberries, grapes, lemons and oranges. Grapes put in cold storage will very soon fall from the stems after being taken out. Cherries and plums, taken from cold storage, will decay very rapidly, but they will keep in cold storage for several days. Of all the delicate fruits that may be protected with ice, there is none with which it agrees as well as strawberries. The best temperature for apples is 32° to 33°. Strawberries keep well at 40° to 45°; pears at 35°. Care should be taken to preserve as uniform a temperature as possible. When large quantities are being put in the refrigerator daily, salt should be used on the ice in sufficient quantities to keep the temperature down, as near as possible, to the figures given above. As often as one-third of the quantity of ice in the chamber is gone, it should be refilled. It would answer to let it run lower, but the above is a wise precaution. These instructions answer for the Wicks, or others constructed on the same principle.

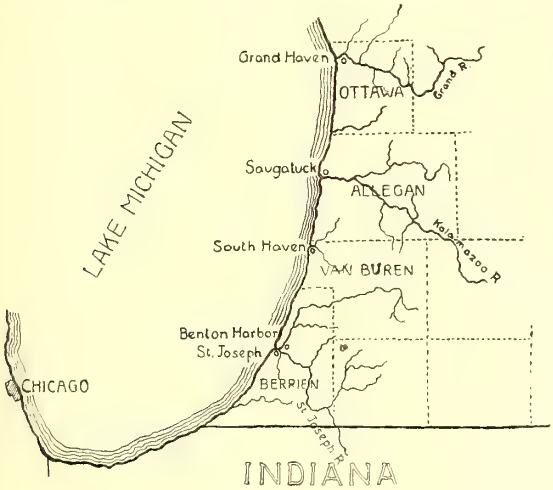
Oswego, N. Y. J. HEAGERTY.

PEACH YELLOWS IN MICHIGAN.

THE DISEASE, THE LAW AND THE RESULT.

THIS most fatal scourge of the Michigan fruit grower first made its appearance in the "peach belt" on the east shore of Lake Michigan about twenty years ago. It began in the southern portion of Berrien county, where the largest orchards in the state were planted. The disease spread from orchard to orchard for several years almost unnoticed, even by the fruit growers.

Peaches were sent to market tinctured with the disease, and relished by the average consumer, because they were in advance of the market. The steady march of the disease was directly northward, along the east shore of Lake Michigan. In 1886, it had reached the northern boundary of Allegan county, beyond the Kalamazoo River. This being the northern limit of extensive peach orchards at that time, the disease stopped, after a full twenty years of a steady march of death. The only check it ever received in its onward course of devastation was the use of the axe, the grub-hoe and fire, and in all localities where this merciless remedy was resorted to most promptly, will be found the best orchards of to-day, both old and young.



Different varieties, both early and late, were all attacked nearly the same in all localities. Trees of all ages and conditions were attacked alike in all seasons, whether cold and wet or hot and dry. The model thrifty young orchard standing on the vergin soil of the heavy timbered lands, composed of loam or clay, was often the first to go, while the neglected one on a sand drift, poor and exhausted, was the last to yield to the fell destroyer. The owner of one orchard might remove his affected trees at sight and destroy them, but if his immediate neighbors neglected to do the same, all perished together. On the other hand, whenever one or two dozen peach growers, joining farms, were all agreed in removing and destroying every diseased tree at first sight, the orchards escaped. The most of these peach growers have a majority of their old trees still left and bearing good crops of fruit. Most of the orchards in which the trees have been removed promptly and the vacancies filled, have grown and borne good crops of fruit; and strange as it may seem, they have developed no yellows to speak of, probably not one in a thousand.

At first, only a few pomologists could be made to believe that the disease is contagious. Nor has it ever been proved beyond the possibility of a doubt that such is a fact, but circumstantial evidence has been so strong and conclusive that nearly all fruit growers on this shore agree that the disease is contagious. At any rate, there is no more argument in the pomological meetings attempting to deny the fact. Some believe it is disseminated by the bees, others by the pruning knife or saw, while a much larger number think it is from the pollen borne through the atmosphere by the winds. There have been a number of cases in the vicinity of South Haven and Casco,* which give very strong evidence in proof of the disease being contagious under certain conditions. On one side of a highway an orchard of a few hundred trees, about fifteen years old, was struck with the yellows, and the owner refused to cut them down until after he had gathered the fruit. The third year following, this orchard was all dead. On the opposite side of this highway was a very thrifty young orchard, six years planted, of over two thousand trees. No evidence of yellows had been seen in this young orchard until the second year after the old one was attacked, when about one dozen trees next to the highway were affected with the disease and promptly removed as soon as discovered, and burned. The next year about forty of these beautiful young trees full of peaches developed yellows, both in tree and fruit. These trees were promptly removed from the orchard with care and likewise destroyed. The old orchard was also taken out, root and branch, and committed to the flames. The next year no yellows appeared in this young orchard, nor has there been any trace of it since. Several cases could be cited equally as strong, but one more will be sufficient to note at this time.

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* Casco adjoins South Haven on the north.—ED.

A prominent peach grower had a very fine bearing orchard of two thousand trees. Just over the division line was another orchard of about twelve hundred trees of the same age. The first orchard came out with the yellows, mostly near the division line—about forty trees. When the owner was notified by the commissioner to cut down the diseased trees, he threatened to shoot the first man who entered the premises for that purpose. The result was, that in three years his orchard was all dead. The owner of the adjoining orchard found a few trees showing the disease the second year, but he quickly cut and burned. During the next three years, over two hundred trees were taken out, and no more yellows appeared. The vacancies have been filled, and a good average orchard is still left, worth two thousand dollars. The orchard is now sixteen years old, and bearing good crops of fruit. I think this is very strong evidence that the disease is contagious.

By request of the fruit growers of West Michigan, the Legislature of this state enacted a law, known as "the Yellows Law," for the repression of this disease. The fruit growers of the peach belt can hardly estimate the direct benefit to them of this enactment. It may be said in truth, that all fruit growers who faithfully and honestly carried out the provisions of this law were well paid by so doing. In most cases, the disease was not only arrested in their own orchards, but the spread of the contagion to their immediate neighbors was also largely prevented. The peach growers of Berrien county have often declared that if they could have had the benefits of that law the same as Van Buren and Allegan counties did, they could have saved the larger part of their orchards. But there was no union of action in Berrien county, either in discovering the developments of the disease, or enforcing the law.

Of course Van Buren and Allegan counties had a fierce combat with the ignorance and prejudice which more manifested in many instances, in strong opposition to the will of the majority. It is now an admitted fact by nearly all intelligent fruit growers that all we have left of the old original orchards—many of them from sixteen to twenty years old—have been saved by the strict observance of this law. Nor is there any doubt now existing in the minds of nine-tenths of the fruit growers of this shore, that all of the younger orchards have been kept free from attack of this disease by "stamping out" the virus in the old trees. The South Haven and Casco Pomological Society is not discussing this vexed question any more, only to hear the reports of the commissioners once a year. These reports have kept us posted on the number of trees cut out, also if any diseased peaches are being shipped from this port to injure the reputation of our fruit growers in the market. In a word, we are masters of the situation, and firmly believe that we can "hold the fort."

For a time, when the disease was moving to the northward at the rate of about five miles per annum, the majority of Michigan peach growers began to lose faith in the business. Very few had the courage to set out new orchards; and more were willing to await developments. When the tide of devastation was checked, all began to take on new courage and prepared to plant new orchards, except in Berrien county, where the destruction had been so complete that no new orchards were planted until the years 1885-6. It is worthy of note here, that those who had been the most prompt and thorough in destroying their diseased trees, were the first to plant new orchards, showing their faith by their works. Since confidence has been restored, the planting of new orchards has increased beyond all precedent. Although no exact statistics can be furnished, it is safe to say that more peach trees have been planted within the last five years in Van Buren and Allegan counties than ever before in any ten years. Berrien county is following, with more caution, yet with very encouraging prospects of future success. The St. Joseph and Benton Harbor fruit region has learned a lesson that will never be forgotten, nor yet repeated in Berrien county.

A very great majority of the South Haven and Casco fruit growers always acknowledged the presence of the yellows in their peach orchards; yet it was a hard matter for several years to convince many of them that the best thing to do was to destroy every diseased tree, then and there. It certainly requires a good deal of courage and self-sacrifice to lay the axe to the root of a peach tree from four to seven years old, and full of beautiful peaches. The diseased peach is very high-colored, and has, in contrast with the green leaves, a most luscious appearance, yet the flavor is very poor and insipid. But just as soon as these same fruit growers were satisfied that it was to their interest to destroy a tree, they showed no mercy. Whether a tree had five or fifteen baskets of fruit, it made no difference; the order was carried into execution. So the work of demolition went on until nearly every vestige of the arch enemy of the peach grower was cut out, burned out and "stamped out," with the encouraging results I have briefly noted.

South Haven, Mich. J. G. RAMSDELL.

TARRYTOWN LETTERS—IX.

BY A. B. TARRYER.

SOME FRUIT-WEATHER TALK—FRUIT SOUPS—DON'T KEEP OFF THE GRASS—LADY SCHNIPTICKET AND THE OLD SHEEP-PASTURE GRASS—AN EDUCATION IN GRASS.

IN reaching after rare fruits that are not as good, and temperance drinks that are not as wholesome as apples and apple-juice might be, we have forgotten how to grow and preserve the King of Fruits in plenty all the year through, as our fathers did." This was Mrs. Tarryer's apologetic remark to several of her guests as she loosened the halyards of a fine bunch of unbruised bananas than hung high in the warm hall, and lowered away until she could select with her own hands the fragrant and dead-ripe specimens for lunch.

That hot day, or the very next one, in June, she served an iced fruit soup, of the color of red wine, floating with sliced bananas and strawberries. It is of no use to ask how that soup was made, for she never has fruit soups twice alike, but just makes them of what ripe fruits she can get, with keen eyes and a scientific imagination for colors and tastes. All of them are marvelously delightful and delicious in hot weather. If the day turns suddenly cool, by dinner-time, she will not allow her ices to be frustrated: cleft pine logs blaze high upon the andirons till the heat is quite tropical. Even Parson Camperdown, who is likely to be the chilliest of the party, with his feet under a little table by the fire, gets enough of it, and finds the iced fruit soup of the color of red wine a most warming thing to begin dinner.

Nobody disputed Mrs. Tarryer's proposition, and the conversation did not turn upon apple orchards at that time, though Mrs. Tarryer and every one who thinks about it, knows there is more money in strictly fine apple-culture (and more ignorance—alas!) than in any other branch of pomology.

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Later in the evening, when Mrs. Camperdown sat in the parson's old gig, preliminary to the home-going, and his mare was allowed to refresh herself with the lush grass of the smooth door-yard—greatly to Lady Schnipticket's astonishment, because Mrs. Tarryer did not object to it—the question of domestic grass was raised. Lady Schnipticket got her money in the railway line, and is not a very frequent visitor at our house, though the talk and fare here always seems to suit some dormant old elements in her sophisticated composition. She remonstrated with Parson Camperdown for allowing his horse and carriage to trample and gnaw the lawn so.

"Won't it pull and destroy all the grass?" she asked.

The parson, seeing his good wife, who is a droll story-teller, surrounded by some of the younger members of the party, stopped to defend himself, which he was well able to do from long familiarity with Mrs. Tarryer's views upon the subject. So Lady Schnipticket listened with open mouth to the parson's elucidation of the idea that it made turf robust and durable to trample on it occasionally. It would take a whole number of the GARDEN to report that conversation between the most polite of gentlemen and the most obtuse of ladies, and we old smokers only heard it from the end of the broad veranda, where the shade of sipho was darkest. But finally the parson mustered up courage enough to assert that if we would spend as much in teaching the people to know grass as we spend in signs to "Keep off the grass" (Lady Schnipticket's place is covered with those staring village obscenities), it would be vastly better for grass everywhere. And he succeeded in reminding the railway lady of the fine short turf of the old sheep-pasture of her childhood, for she remembered how a stile from the walled-in garden of her early New England home used to let her go romping down among shaded green slopes, past grey, mossy and vine-clad ledges with her school-mates, and she grew quite pensive and even beautiful and girlish for a moment in the light of the rising moon filtering through the young leaves full upon her. Then the parson got in his amusing story about the absurd wriggling of lamb's tails while drawing their needful sustenance, kneeling at maternal founts; said tails being stiff close to their bodies, but flaccid for the most part at their ends—and how Brown, his best vestryman, secured a new bell for the church by likening the sound of the cracked old one to a "lamb's tail in an old hat," which was published in the local newspaper; so that, in the general good humor, many outsiders contributed.

These things, or their collaterals, visibly affected Lady Schnipticket, and I thought, for a moment, that Parson Camperdown would have drawn his scheme on her for getting the church horse-sheds shingled and having the holes, pawed by fly-bitten horses for centuries, nicely filled with solid clay gravel, but he didn't. Perhaps he never thought of it! Mrs. Tarryer has taught him better. She likes all sorts of people around her in amity, but will have none of them preying upon each other on our premises. The late Col. Schnipticket died suddenly, far west, with a hole in his hat and very much regretted, in Jay Cooke's time. Parson Camperdown was considered too enthusiastic over some of the Colonel's grand railway schemes for the purses of several of his parishioners who could ill afford to lose money. There was a mild corrective meaning in Mrs. Tarryer's giving him "Lily among Thorns"—a new version of Solomon's song—for his last Christmas present. In it are plaintive and touching references to sheep, etc. These fast colors were at the bottom of this grass conversation, and give us a glimpse of how the world moves.

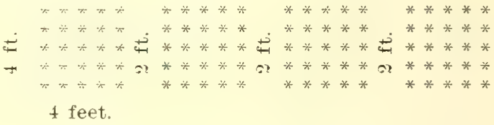
Lady Schnipticket is alert in money-matters, and well able to take care of herself, so long as affairs continue in a shape she is used to, just like any one else. Men and women spring and fall like grass when circumstances change. "Now do tell us, Mr. Camperdown," she asked, sweetly, "how to bring that old sheep-pasture turf back again? I really want to know."

"By studying grass, sheep and the land," returned the parson, promptly. He knew he was correct, because he had often heard Mrs. Tarryer say so.

"Can't you give us a few details?" inquired the lady, politely. But by that time Mrs. Camperdown had told all her fresh stories to the young people, the mare had grass enough, the wind blew cooler and the parson heard a voice he knew he must obey. Indeed, it was time to go home.

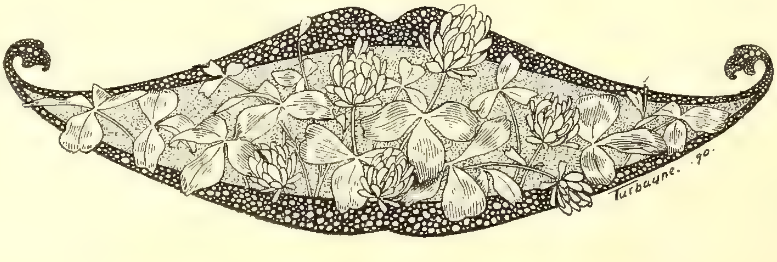
We two or three old smokers who had not been listening in particular, knew Lady Schnipticket had asked a question—How to get the old sheep-pasture turf back again?—which is fit to occupy the best minds of this generation. Our Saratoga philosophers will have it up within a year or two. A nation cannot go back on a forty years "progress" in a moment. Just as the parson said—quoting from Mrs. Tarryer—there must be study of grass, sheep and the land, which is a great deal poorer than it used to be. Sheep are farther off—wilder, and the fences are down. Grass? Who looks at that but to scrape enough of it?

The easiest way to get grass so we can look straight at it—and this is the first step towards sheep-pasture sward—is to take the clean turf that suits our fancy by its appearance and behavior, and cut it into inch pieces and plant it in some such way as this in a garden:



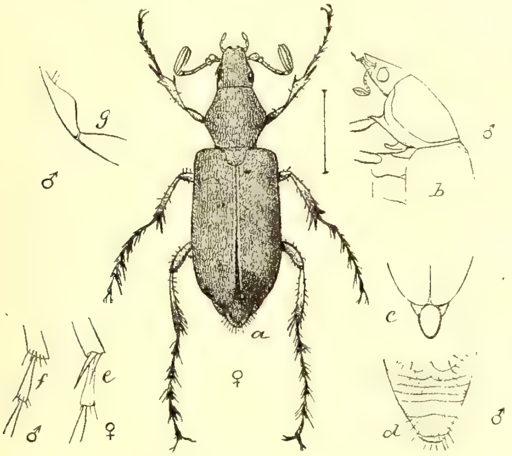
Let us play those plats are four feet square, though any other form will do as well. The spaces between the plats may be two feet and the alleys beside each row of plats four feet. In cutting the sward into inch bits, all mixtures, of whatever kind, will be excluded, and the weeding will be thorough, with the design of growing each variety tested in pure cultures into a solid sward of itself alone.

Whoever attempts this very fascinating employment on the smallest scale, as of an inch bit of each variety under trial, cannot fail to learn much about grass and the land in a few months. In the words of one who has tried it, "It is as good as a liberal education." Possibly we may hear Lady Schnipticket talking about the sheep-business for some future letter. She will need to make up her mind what kind of sheep she likes to eat and wear the wool of best, and which will most remind her of her young and innocent days.


Turbayne. '90.

THE ROSE CHAFER.

A NATIVE North American insect, there is every reason to believe that this rose chafer, or rose bug, as it is more generally called, has increased in number with the progress of horticulture, for the perfect beetle evidently shows a preference for the blossoms and sweeter and more tender fruit of our cultivated plants as compared with those of wild plants. Another reason may be found in the increased area of pasture and meadow lands which form the natural breeding grounds of the species. The first published account of this insect seems to be that given by Dr. Harris in his "minutes toward a history of some American species of Melolonthæ particularly injurious to vegetation" in 1827. In this account Dr. Harris says that at the time the bugs were first noticed, they were confined to the roses, but within forty years they had prodigiously increased in number, and had become very injurious to various plants. From this it would appear that as far back as the last century the insect was known as injurious.



THE ROSE CHAFER.

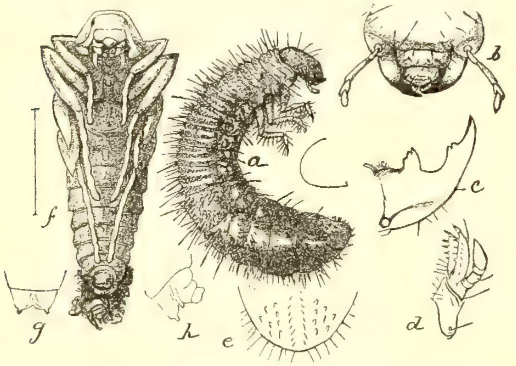
Macrodactylus subspinosus: *a*, female; *b*, anterior part of male to show the prosternal metacoxal process; *c*, pygidium of male; *d*, abdomen of male; *e*, tip of hind tibia of female; *f*, ditto of male; *g*, front tibia of male—all enlarged (original).

According to Harris, the female beetle lays her eggs to the number of about 30, about the middle of July, at a depth of from one to two inches beneath the surface of the ground. He does not state the favorite place for oviposition, but in our experience the larvæ are especially abundant in low, open meadow land or in cultivated fields, particularly where the soil is light and sandy. Harris states that the eggs hatch in about twenty days, and, while the period will vary with the temperature the larva is found fully grown during the autumn months. With the approach of cold weather it works deeper into the ground, but in the spring will frequently be found near the surface or under stones and other similar objects, where it forms a sort of cell in which to pupate. In confinement the pupa state has lasted from two to four weeks. The perfect beetle issues in the New England states about the second week of June, while in the latitude of Washington it is seen about two weeks earlier. It appears suddenly in great numbers, as has often been observed and commented upon, but this is in conformity with the habits of other Lamellicorn beetles, *e. g.*, our common May beetles (*Lachnosterna*). It remains active a little over a month, and then soon disappears. The species produces, therefore, but one annual generation, the time of the appearing of the beetle in greatest abundance being coincident with the flowering of the grape vine.

GEOGRAPHICAL DISTRIBUTION.—It is not represented in the extreme south and west of the Rocky Mountains. Northward it extends into Maine, Canada and Minnesota. It is certainly absent, or at least very scarce, in western Kansas, though common and destructive in the eastern and more wooded portions of the state. Professor Osborn finds the beetle not particularly destructive in Iowa, and our experience shows that as a rule it is less destructive in Mississippi valley than in the east. In the gulf states it is replaced by a closely allied species, *Macrodactylus angustatus*, which has not yet proved to be injurious and is in all probability less abundant. A third species, *M. uniformis*, occurs in the extreme southwest of the country, and of this we received in July, 1899, specimens from Judge J. F. Wielandy, of Springer, New Mexico, with the statement that they were injuring apples.

FOOD PLANTS AND RAVAGES.—The food of the larva consists of the roots of grasses and probably also of other low plants. Whether it also feeds on the rootlets of trees and shrubs has not been definitely ascertained, although the larvæ have been found quite numerously around the bases of oak trees near Washington, both by Mr. Keobele and Mr. Schwarz. We found them quite numerous in the sandy low lands of the Merrimac valley, New Hampshire, on cultivated ground, where they must have fed on the roots of various weeds or on those of meadow grass and cultivated rye and maize. It is probable, however, that they occur yet more numerously in unplowed pasture and meadow land than in cultivated fields.

The beetle has a partiality for flowers, but also feeds upon leaves of various trees and bushes, and attacks certain fruits. It has a predilection for the flowers of roses, wild as well as cultivated,* and, in the experience of many observers, prefer white roses to red ones. Another favorite food is the blossom of the grape vine, with a decided preference for that of the Clinton. This last fact was first pointed out by Walsh in his first report on the insects of Illinois (p. 24), and has been confirmed by many other observers and by our own observations, Dr. Lintner, in his first New York Entomological Report (p. 229), contradicts this experience, which only goes to show how the habits of the same species will differ in different sections of the country. Flowers of raspberries and blackberries do not escape its ravages. The beetles also devour the blossoms of *Pyrethrum cinerariæfolium*, the plant from which pyrethrum insect powder is made.



VARIOUS STAGES.

Macrodactylus subspinosus: *a*, full-grown larva from the side; *b*, head of larva from the front; *c*, left mandible of larva from beneath; *d*, left maxilla of larva from above; *e*, last ventral segment of larva; *f*, pupa from beneath; *g*, tip of last dorsal abdominal segment of pupa; *h*, last segment of pupa from the side—all enlarged (original).

The foliage, of most, if not all, of our cultivated fruit trees and especially apple, pear, peach, cherry and plum, at times suffer greatly, the two last named being apparently more attractive than the others. The foliage of cultivated grape vines is almost as eagerly devoured as the blossoms, and the leaves of oak, alder and other forest trees also serve as food. Of low-growing plants, the beetles cut the leaves of strawberries, rhubarb and of nearly all garden vegetables, as also of sweet potato, corn, wheat, grass, and many wild plants. Not satisfied with this amount of damage, the beetles attack the fruit of peaches, cherries, apples and grapes when just forming.

Among ornamental plants, the rose is the greatest sufferer. Harris states that the beetle was first noticed on the rose (hence its popular name), and that it afterward acquired the habit of feeding on grape vines and fruit trees.

REMEDIES.—It has been assumed by most writers that we cannot successfully attack the rose chafer in any of its earlier states. To search for the eggs in the ground would be impracticable. It does not, however, follow because of the poor success that has generally resulted from attempts to destroy similar larvæ that they cannot be successfully destroyed. In the case of the common European cock-chafer and of our own white grub, the methods adopted have consisted in plowing and hand-picking. The experiments made, however, on a similar larvæ with the kerosene-soap emulsion,* clearly show that we have in this insecticide a means of successfully destroying the bulk of the larvæ of the rose bug wherever they are known to be sufficiently abundant to justify such treatment. A thorough investigation should be made in the direction of ascertaining the preferred breeding grounds of the species, and it were rash to say here that we have no effectual mode of preventing the insect, notwithstanding the disfavor in which this mode of warfare has been held in the past.

It is evident, however, that for the present we should concentrate our efforts on the destruction of the beetles, especially when they first issue from the ground and congregate in the garden on our roses, grapevines, and fruit trees. A brief statement of the various methods that may be employed for this purpose may prove advantageous. Hand-picking and killing the beetles, either by crushing them or throwing them into hot water or water having a scum of kerosene upon it, has proved useful and satisfactory in a limited way, as also the shaking and knocking down of the beetle into pans or upon sheets saturated or smeared with coal oil. These measures are best carried out and most satisfactorily in the early morning hours and towards evening, as the beetles are then more sluggish and not so quick to take wing as they are during the heat of the day. White roses, spiræas, or deutzias, planted on a place, will attract great numbers of the beetles, and thus no only facilitate the destruction of these last, but act as a kind of protection to other plants.

As to other topical applications intended to destroy the beetles, whether directly or by poison taken with the food, the experience with the arsenites is that they are of little avail, and the experience with other materials, like hellebore and pyrethrum, has been so conflicting, that we cannot consider either of them reliable or satisfactory. Pyrethrum would seem to have given on the whole the most satisfactory results, and the experience of Mr. E. S. Carman, editor of the *Rural New-Yorker*, would certainly show that it may be used advantageously.

Col. A. W. Pearson, of New Jersey, states that the "eau celeste" (solution of sulphate of copper with ammonia) is not only the best remedy for mildew, but at the same time an effective poison to the rose-bug.

The trouble with all these remedies is that the beetles during their brief season continue to issue from the ground and to congregate upon their favored plants in

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*The Cinnamon Rose, *Rosa cinnamonica*, is said to enjoy immunity.

(*) Insect Life, i. 48.

such numbers, under favorable circumstances, that however fatal an application may be it has to be continued, and the most persistent may justly become discouraged in a fight with these beetles when they are abnormally abundant and swarm to the extent we have known them.

As early as 1829 Dr. R. Green, as quoted by Harris, urged as a preventive measure the covering of the grapevines with millinet, but however valuable such a method may be for choice vines in limited numbers, it would evidently be too costly for large vineyards or for larger fruit-trees.

Another protective measure (first suggested in the *Rural New-Yorker*, May 19, 1883) is to dust the plants with air-slaked lime or gypsum, and Prof. C. M. Weed has suggested as an improvement upon it (7th Ann. Rept. Ohio Agr. Exp. St., 1888, p. 151) a liberal spraying of lime water, from one-half to one peck of lime to a barrel of water. Mr. E. A. Dunbar, of Ashtabula, Ohio, who tried this "whitewashing" of his grape-vines and peach trees, reports most satisfactory results. —*C. V. Riley.* (*Adapted from current number of "Insect Life."*)

LIQUID MANURES.

SOME POINTS WHICH ARE OFTEN OVERLOOKED.

It is well enough to look some months ahead for the manure needed. Doubly liberal manuring lies at the bottom of big crops. The profit comes from maximum crops; hence the importance of securing, at reasonable prices, manure that will produce the largest crops. There are differences in value among stable or farm-yard manures. Some farm-yard or stable manure has treble the value of others. We are apt to make a distinction between cow and horse manure, possibly between fresh and rotted manure; but with this we stop. But other points about stable manures are of more importance. One of these is the proportion of urine.

A ton of fresh solid excrement of horses contains 8.8 pounds of nitrogen, 3.4 pounds of phosphoric acid and 7 pounds of potash. A ton of fresh solid excrement of cattle contains 5.8 pounds of nitrogen, 3.4 pounds of phosphoric acid and 2 pounds of potash. A ton of fresh urine of horses contains 31 pounds of nitrogen and 30 pounds of potash. A ton of fresh urine of cattle contains 11.6 pounds of nitrogen and 9.8 pounds of potash.

It will be seen that, at the commercial values of nitrogen, phosphoric acid and potash, taking the same weights of fresh urine and of fresh solid excrement of horses, the first has six times the value of the latter; and of cattle, nearly four times. It is therefore plain that the greater the proportion of urine, the more valuable the manure. However, in the urine there is no phosphoric acid. This is a sad lack, which, however, can be supplied by the use of some phosphatic fertilizer.

But urine has to the gardener a greater value, compared with solid excrement. The earliest crop brings the best prices; hence a manure that will make the crop larger and also earlier gives us a double value. Urine does this, for the nitrogen in urine is all in solution, and in a condition fit to be taken up immediately by the plants. Pound for pound, it is fully as valuable as the nitrogen in nitrate of soda. On the other hand, the nitrogen in solid excrement is inferior, since most of it is insoluble and in a condition unassimilable by plants. It is contained chiefly in the undigested, not to say indigestible, portions of the food. Urine is the manure *par excellence* for the gardener, since it acts at once.

However, we must have a care as to the preservation of the urine. Unless properly managed, no other manure so quickly deteriorates; the nitrogenous components of urine, viz., urea, uric acid and hippuric acid, are precisely those constituents of animal secretions which decompose the first and the easiest. Hence, Professor Storer says that cisterns to hold urine can hardly be profitable. The best way, it seems, in which to preserve the manurial value of urine is to have it absorbed by straw or other litter. This retards its decomposition. When solid excrement, urine and enough litter to absorb the liquid, are mixed together, the mass keeps remarkably well. At the end of five warm months, decomposition had hardly begun in such a heap.

When the gardener can get urine fresh, he can hardly get a manure more "forcing." But otherwise he would better use the urine mixed with litter and solid excrement. And the point for him to remember is that manures from stables where the urine is absorbed and saved is worth to him, pound for pound, far more than manure from stables where the urine is allowed to waste

Of great comparative value to the gardener is, also, manure liquor, *i. e.*, the liquid that drains from manure. It is likely that in Switzerland, Holland and Belgium the farmers overrate this fertilizer; but it is nevertheless true that the gardener, even in this country, can use it to advantage and with profit, though he prepares it artificially. In its composition it much resembles urine, as it contains little phosphoric acid and much nitrogen, and also in being liquid. Hence it is a splendid forcing manure; it acts strongly and immediately, and this suggests that its use is to be on crops that are to be hurried to maturity. There is this point in its favor, also, that it is not apt to "burn" crops, as guano does in dry weather. Völcker found that it was almost twice as concentrated from fresh as from old manure.

S. M. J.

CANNING AND PRESERVING.

THE QUESTION FROM THE GROWER'S STANDPOINT—DO CANNERS PAY A FAIR PRICE FOR PRODUCE?—OPINIONS AND SUGGESTIONS.

Fifth Paper.

AS STATED previously (p. 151), the problem of ways and means in fruit growing, so far as its solving is to be done by canning and preserving, demands more consideration in the hands of those who should be the most interested, the growers themselves.

We have gone over the ground of production, marketing and competition, and have come to the logical conclusion that no escape from the ills that beset us can be found through the channels with which we are familiar. As a most natural sequence, then, we must search out new methods of work and disposition in the hope of finding the most profitable way out of the dilemma.

Unquestionably there are advantages in the alliance of the canner and preserver with the fruit grower that should not be overlooked; but can any methods be introduced which will materially increase these advantages? Again, are there no means within our reach whereby we can find a promising solution to the alleged over-production difficulty? To this end the writer addressed the following questions to residents of Connecticut, New Jersey and New York who had grown fruits and vegetables for many years, both for markets and factories, and who were in a position, we believed, to know something of the subject in which we are interested.

1. Do you grow fruits and vegetables for canning or preserving factories?
2. What kinds and in what quantities?
3. Do you find it profitable? In other words, can you make more money growing for the factories on contract than you can putting the same kinds and quantities on the general market at current prices?
4. In your opinion, are growers paid a fair price for the produce sold to canners and preservers?
5. What proportion of your arable land is devoted to growing produce for factories?
6. Are you located near a market where a fair price is paid for produce?
7. Do you divide your produce between the markets and the factories? If so, do you consider it more profitable than selling to either one exclusively?
8. What advantages, if any, accrue to you by reason of the location of a factory in your vicinity?
9. What would you do with your produce, supposing no factory was near you?
10. Do you think you would change your crops? That is, are you of the opinion that you would grow a different line of things if you could not reach a factory?
11. What plan, in your opinion, would give you higher prices for your products—a plan at once effective and equitable?
12. Can you see any relief from the prevailing low prices for such products as you raise? What is it, and how can it be carried into effect?
13. What is the future outlook for your business, presuming that you supply both canners and the general markets, or either.

It will be observed that these questions seek to cover the ground again over which we have already gone. It is but just to say that, so far as the writer is aware, none of those who replied to these questions had seen THE AMERICAN GARDEN, and consequently were not familiar with the line of research on which we had worked. So many of the replies were similar in purpert that we have embodied them in the general text which follows, without regard to the locality from whence they came.

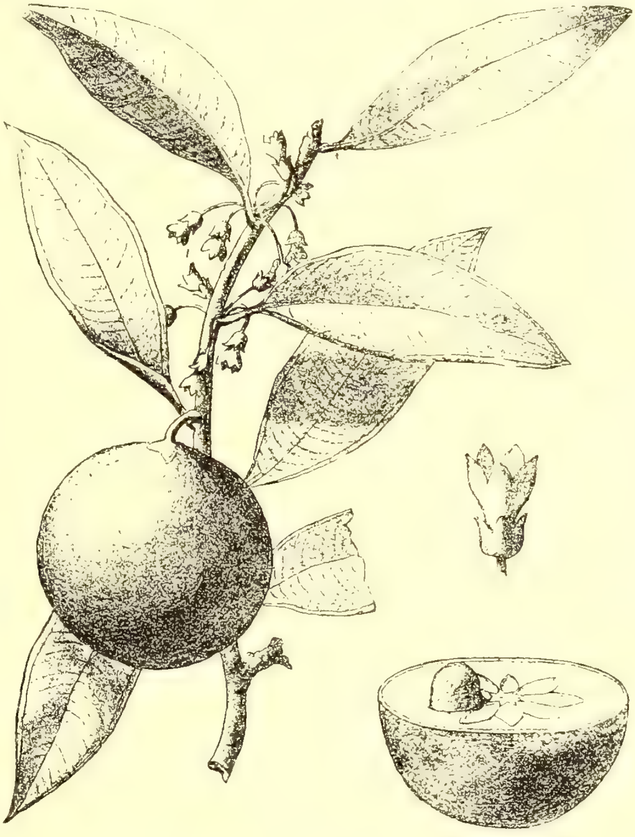
Questions one and two are largely introductory, and have no especial bearing on the subject under discussion.

In reply to question three, the opinions of those who answered were largely in the affirmative, although it should be noted that those who were inclined to favor the markets in preference to the factories were located near good markets. One man replied thus: "My products I consider too good for any market but the best. I ship to a select trade, and hence have no use for canning factories or the ordinary market." Our friend is advantageously situated, and we can leave him out of the question at issue.

Question four brought out wide differences of opinion, and had the replies not been from men whom we had every reason to believe were capable fruit and vegetable growers, we should incline to the opinion that their views were "growls of discontent" from morbid, dissatisfied men. The general impression prevailed that the grower was not paid a fair price for his products by the factory owners.

The main argument was that the factory owner required too good quality for the price paid, and that the sorting or examining was often one-sided. In many cases our correspondents said that the methods of examination were dishonest.

"We take a wagon load of tomatoes to the factory; if it happens that the season's crop promises to be large, the examiner will complain that our tomatoes are not well ripened, that the color is not up to the mark and that many of them are not fit for use. They make a general 'kick,' and wind up by deducting some hundreds of pounds from the weight of our load. If the injustice is so apparent that we do a little 'kicking' on our own account, we are marked men, and there is trouble with everything we bring." So writes one correspondent. Another writes: "We are not paid a fair price for our products. We deliver tomatoes at $7 a ton, and at that price, together with the low prices at which the factory owners procure most of their labor, when compared with the price the consumer pays for the catsup and canned goods of Blank & Co., I would suppose there was 200 per cent. profit in the business." (See comment on cost of labor, page 104, February AMERICAN GARDEN).



THE STAR-APPLE OR CAIMITE. (See page 406.)

As stated, the general sentiment is that too little is paid for the produce and that the difference between the cost of manufacture and the cost to the consumer represents a profit entirely too large to be considered fair to the grower who produced the crops by hard labor. Here we come to the first conflict between the producer and manufacturer. It will be remembered that in our account of the interviews with canners, the claim was made that the prices were uniformly good, and that, as a rule, the grower could make more money growing for the factory than he could for the general market. (See answers to question 3, page 436, December; also to question 7, following in this paper). This appears to be another opportunity for further investigation, which THE AMERICAN GARDEN will endeavor to follow up to the profit of all concerned.

The average proportion of land devoted to growing produce for the factories was five acres out of fifteen, or one-third of the arable land.

The replies to question six were largely in line with the position taken by correspondents on question three, *i. e.*, location near a fair local market brought negative replies to the question, and *vice versa*. It was found that in the majority of cases when the grower was not prejudiced by the proximity of an unusually good market, the ground was taken that the markets for the earlier crops and the factories for all later, was the proper method of procedure.

Question eight seemed to be a poser to most of our correspondents, and the answers were about equally divided between for and against. Question nine fared the same way, and possibly was not a fair one to ask, though the real answer to it came out, in the majority of cases, as answers to number ten, which question was also answered according to whether the grower had a market to fall back on or not. It was found that in every case where the grower took any great portion of his products to the factories, the opinion was that without the factories the methods of cropping would have to be changed or modified.

"I grow on an average ten acres of tomatoes each year for the factories, taking to them also parts of my crops of string beans, squashes, small and orchard fruits" writes a New Jersey grower. "Without the factories, I would be obliged to reduce my acreage of tomatoes at least three-fourths, not being near enough to a market where the demand would be sufficient to anywhere near take the product of ten acres. On the other hand, I sometimes question whether it would not be policy for me to cease growing for the factories and put my strength into raising a number of things of the best quality for local markets." So writes one correspondent. In opposition to this opinion, another correspondent says, in substance, that if he could not reach the factory he would be obliged to turn his attention to growing orchard fruits or to general farming. His argument is based on the fact that he is some miles from a good market, with poor shipping facilities. It is obvious that location is thus one of the prime factors of this question as it bears upon the growers.

Questions eleven, twelve and thirteen cover ground somewhat removed from the subject properly in hand, though by no means wholly foreign to the point. But two of our correspondents cared to express an opinion on these questions, so we have held them for enlargement and to form the basis of our next paper. These questions are of vast importance, forming as they do the very groundwork on which rests the entire question of handling the exigencies arising from the flagrant prostitution of the law of supply and demand. In considering them we may happily strike the chord which will lead us to a desirable solution of the vexed problem; though if the evidence shall not be positive enough to cause an indisputable conclusion to be formed, we shall believe that the facts brought out justify our efforts.

[TO BE CONTINUED.]

THE STAR-APPLE OR CAIMITE.

* * * *"And what is next, like an evergreen peach, shedding from the under side of every leaf a golden light—call it not shade? A Star Apple."*—KINGSLEY.

A tropical fruit worthy of much greater attention than it has yet received in our Gulf States, is the star-apple of the West Indies. It is a sapotaceous tree, known as *Chrysophyllum Cainito.* Our illustration on page 205 is reproduced from *Le Jardin*, and presents the essential features of the plant and fruit. As will be seen from the cut fruit, the name is very appropriate. The late P. W. Reasoner gave the following account of it in Mr. Van Deman's bulletin No. 1, on tropical and semi-tropical fruits:

"The Star-apple tree ultimately attains a height of 30 feet, and is a profuse bearer. The fruit is of the size of an apple, though nearly as smooth and round as a billiard ball. It ripens in April and May. When cut into halves transversely the fruit discloses a greenish or purple pulp, with whitish star-shaped 'core,' containing from four to ten brown seeds as large as pumpkin seeds. * * * Star-apples are worth from 15 to 30 cents per dozen in Key West, and there is a good demand."

Bois and Mawry, in *Le Jardin*, distinguish three leading varieties of Star-apple: *Jamaicense*, with sub-oval, reddish-green fruit; *Cæruleum*, with a globular, small, blue fruit—this is known in Martinique as the *Gros Bouis; Portoricence*, with small leaves.

The Star-apple is cultivated in Brazil and Guiana, and has been introduced into India, while as may be noted from Mr. Reasoner's remarks, it is grown to some extent in southern Florida. Further attention to its culture will probably increase its range, and if it will "ship" or get to the great cities in good shape, it will be only another addition to the profitable resources of the flower state.

A TALK ABOUT MELONS.

THE CANTALOUPES OF ALL KINDS—FANCIES AND IDEALS—MELON SEEDS.

A PERFECT cantaloupe! have you the recollection of one? Then you will treasure it in your memory, for in its full perfection it is a rarity, and in the estimation of some, it has no equal in our summer fruits. To constitute perfection, the fruit should be removed from the vine shortly before it is ripe; it should be washed with soap and cold water, then dried in a soft towel, and then set to ripen in a dry place. A cantaloupe that before washing smells like a potato, will in a few hours begin to give out an inviting perfume, and when this odor has reached its proper measure and character is the time to cut the melon, regardless of the clock.

Almost every lover of the cantaloupe has in his mind an ideal melon, based either upon a recollection of one long since eaten, perhaps in his boyhood, or upon what he believes should be the form, size, character, color and flavor of a perfect fruit. The seedsman has his ideal, and hunts the world over for seeds to test, in the hope of some day realizing it. Hundreds of varieties from all parts of the melon-growing world have been grown during the last ten years, and still the hope is unsatisfied. The trucker also has an ideal, which is largely a commercial one; he wants a hardy, productive plant; a well-netted, tough-rinded fruit, that will ripen off the vine; a melon that is neither small or large, and that has a good smell and taste. He also wants an early ripener, and one that does not run through its cropping too soon. The seedsman tries to meet these wishes; but at the same time to perfect the fruit in its quality, to suit his own taste and that of the epicure. My own ideal melon is of the size and form of a large ostrich egg, with a thin, finely netted rind, thick grass-green flesh, a small seed cavity, and a sweet aromatic flavor.

Some fifty years or more ago, there was introduced into this market a small green-fleshed cantaloupe known as the "Center melon," which for a time, far excelled in richness of flavor all of its competitors. It was flat in form, grooved, and finely netted; but was too small to suit the ideas of the trucker. This Center melon was the progenitor of the Jenny Lind variety, named about 1846; but where it came from no one now appears to know. I am inclined, however, to believe that it originated in the east, and possibly in the table land of Armenia, where netted green-fleshed melons are produced in abundance, some of which are flat, and where the same perfect flavor is to be met with. These Armenian melons belong to a hardy race, are quite productive in our climate, and can stand it as well as any of our own kinds; they are as yet entirely unknown to to our seedsmen. I grew several last year. In form are they flat, globular and oval, and all are fine-grained, thin-rinded, green-fleshed, and closely netted. This oval cantaloupe has come nearer to my ideal than any one I have yet tested, and I hope to give it a better trial this coming summer. As oriental seeds always come mixed in the packages, it will take time to separate the varieties by selection. As I have discovered Erzeroum, in Armenia, to be a great melon center for both cantaloupes and watermelons that are calculated to stand our hot summers, it is to be hoped that our enterprising seedsmen will take steps to secure a full line of seeds.

The cantaloupe has largely multiplied in its varieties in our country of latter years, and we have now those that are white-fleshed, yellow-fleshed, red-fleshed and salmon-fleshed. We have also netted, toad-marked and smooth fruits, with green, yellow and whitish rinds. Attempts have been made to grow the winter varieties of Naples and Malta, which may be ripened from Christmas to Easter, but as yet with no encouragement. The large green melon of Naples is the best and grows in boggy land, but has thus far failed when planted in the same kind of soil in Florida, under my directions.

In size the cantaloupe varies as much as in quality, and the extremes of weight are a few ounces and fifty-two pounds, the largest being coarse-grained and somewhat fibrous in texture. Up to twenty or twenty-five pounds, fine-grained fruits are produced, especially of the green-fleshed varieties. The largest imported kind was introduced from Portugal, and of native varieties the largest was brought recently from Colorado; both at their maximum weight over fifty pounds, being as large as very large watermelons. Such brobdignagian fruits are valuable as surprises for a dinner company, but the smaller kinds are more pleasing to the palate.

For a combination of large size and fine quality, perhaps no imported variety ever equalled the Persian melon, grown for many years in the vicinity of Washington city, under the name of the "Hunter cantaloupe," a long, golden, closely netted fruit, with green flesh, reaching twenty inches in length and a weight of twenty-five pounds. This must not be confounded with the "Casaba" or Smyrna melon, often erroneously called "Persian," the seeds of which were sent to the United States by Dr. Goodell, now of this city, on several occasions when residing in Constantinople. Persia is a land of melons, from which we have had, as far as known to me, but four varieties of cantaloupe, two of which are still produced; and no watermelon. Who now grows the "Ispahan" cantaloupe of the late Bayard Taylor. Travelers praise the melons of Persia, write about them, and throw the seeds away! Missionaries and American physicians have occupied the garden spots of the land of Ahasuerus for half a century; have sent thousands of letters home, and have often visited their own land in person; but where are the apricots, quinces, melons and pomegranates of their introduction? Where are the fruits of Persia introduced by our diplomates through our Agricultural bureau? Personal efforts made during the last four years have thus far failed to bring a single seed. In a horticultural sense, the land appears to be walled in.

My own cantaloupe tests have been made with seeds from France, the north and south of Italy, Tripoli, Turkey, Turkestan, southern Russia, Russian Georgia, Cappadocia, Armenia, the valley of the Euphrates, Palestine and Japan. Many melons that are excellent in France and northern Italy will not grow in our climate on account of the heat. Those from the lands south of Naples do fairly well, but their quality for the table is inferior. The toad-marked (*rospe*) melons of northeastern Italy, under repeated tests, have always failed, and so have our netted varieties, in the cooler parts of that peninsula. Worms and bugs appear to delight in the flavor of the delicate foreign vines, and if the plants should in part escape their ravages, their leaves droop under the sun, and the fruit is not worth cutting. There is something very peculiar in the effects of soil and climate in the production of growth and flavor that we cannot understand. That seeds from cool countries should fail here, and that those from some hot countries should not, we can understand; but why varieties from other hot countries, having a good soil and cold winters, should utterly fail in quality of fruit when it to a certain degree grows well, we cannot explain. Of all foreign seeds, I have never seen any that grew so exactly in all respects like our own, as those from the World's center, the ancient and storied land of Ararat, now called Armenia.

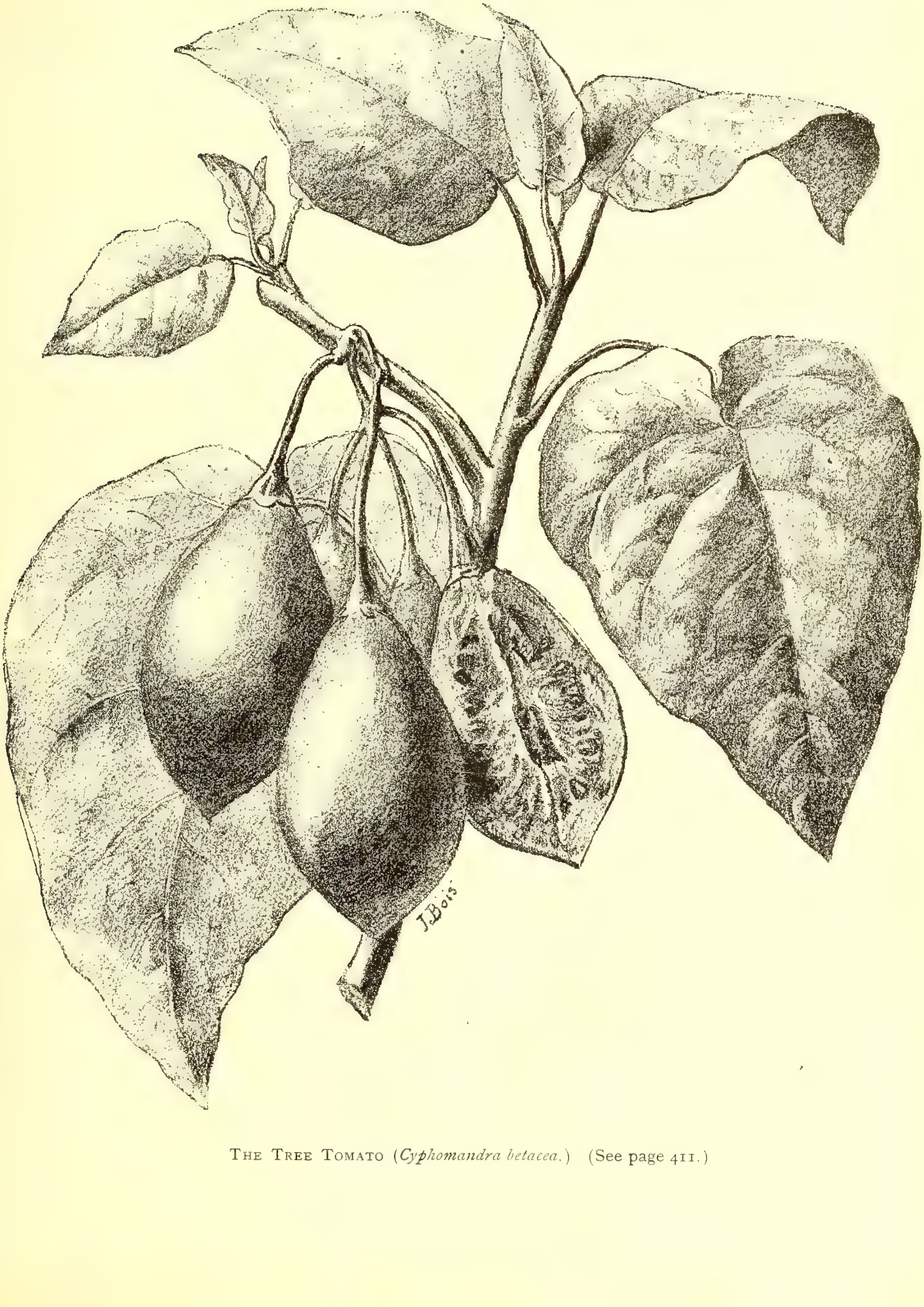
Cantaloupe seeds are a special and curious study. Foreign seeds rarely look like those raised here, and may be classified as follows, viz: 1. Minute yellow seeds, as those from Nangasaki, Japan; 2. Broad oval seeds, short or long, white, yellow, or brownish-yellow; 3. Long, straight brownish seeds of very large size: 4. White, yellow or brownish, straight, narrow and pointed seeds, like our own in form, but larger; and 5, straw-yellow, bent or waved seeds from salmon or red-fleshed melons. These is nothing that as a general rule Americanizes so rapidly as a foreign cantaloupe, if it can only be made to produce a perfected fruit; one year working an entire transformation in all of the netted varieties. In the smooth yellow melons with salmon-red flesh, there is an exception, and the seeds of the long banana cantaloupe still have a bright yellow and waved surface after some years of acclimatization. Salmon-fleshed American melons usually bear a brighter yellow seed than is produced by the green-fleshed varieties. Broad oval foreign seeds rarely produce fruit in America, and I have yet to see the first one yield a valuable melon.

It is difficult to tell whether the bee is at best the enemy or the friend of the seed-grower, as he is largely both, for without his work in carrying pollen, the fruits of diœcious plants would not be fertilized, and without it also his mischief in mixing new varieties with inferior sorts would not be accomplished. He offsets his bad work by producing new varieties which are sometimes of great value. This work may be better and more wisely done by the horticultural philosopher, who acts designedly by combining size and hardiness on the one side, with delicacy and productiveness on the other. This is one of the most interesting works of the horticulturist in the production of new varieties of fruits and flowers, and may be one of great pecuniary gain, as almost fabulous prices are sometimes received for new seeds, a new grape vine or a rose bush.

Cantaloupes may be divided into two classes; one that ripens to the best advantage in the house, and the other on the vine and exposed to the sun. Netted and grooved melons, as a rule, attain their finest flavor in the house, and should be pulled as soon as the green color at the bottom of the grooves has fairly begun to lighten. If a netted melon is pulled a little too soon it will keep a long time but never ripen, and some varieties when apparently well matured will only go to decay if separated from the vine. Such are not favorite sorts with the trucker, but may be improved by crossing with such as ripen more readily.

Cold nights, cold damp ground and a mild temperature, with very little or too much rain, are all antagonistic to the growth and maturing of our cantaloupes. Cold ground in the day with a moderately warm sun will cause a large melon to grow flat at the bottom and very convex at the top; the flesh of the upper part will also be much thicker and better flavored than that of the bottom. This rule of flavor is a general one, and the generous way to divide a melon is to cut it through the middle of the ground spot, either cross-wise or through the stem and flower ends. In seasons like that of last year, melons become only about half netted for want of sun, and are poor in flavor when considered ripe; vast quantities brought to market never ripen. The melons from my Armenian seeds were exceptional in being densely netted.

A melon produces two kinds of flowers, the long stemmed, unproductive or staminate, and the short-stemmed, productive or pistillate, at the base of which is the rudimentary fruit or ovary, and in which the seeds are to be developed by the mysterious influence of an orange yellow powder contained in the anthers and known as pollon. Under the microscope this powder is found to consist of grains of peculiar form, some of which are very curious, varying with the species of flower producing them. A cross is the product of the pistillate flower of one variety acted on by the pollen of another variety, and this intermediate may result from



The Tree Tomato (*Cyphomandra betacea.*) (See page 411.)

the visit of a bee bearing pollen grains on his legs, or the gardener may effect it artificially.

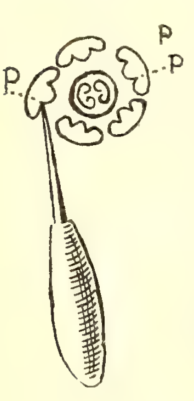
In Armenia there grows a cantaloupe, probably of large size, to judge by the seeds, which is so sensitive to the heat of the sun that the gardeners are in the habit of covering the young melons with earth until they reach a certain size. This variety will be tested the coming season in several localities. The seeds are very large and white, much larger than any we have, and resemble those of the curious yellow Cappadocia melon introduced by me several years ago and not now grown.

Some years ago a few winter cantaloupes were grown in this latitude, but the measure of success did not encourage the grower to continue the experiment; still I see no reason why other attempts should not be made. American visitors to Naples are willing to pay sixty cents for a green melon in winter, and speak of them as wonderfully fine; in fact, it is the finest Neapolitan variety, and ought to be grown in some southern state if possible, as a new industry. If the Naples melon will not succeed, the Malta green one should be tried. These melons are put away in the fall before they begin to ripen, and are kept in a cool place. When one is to be ripened, it is hung up in the open air in a warm place, in a net, or a little bundle of straw, as bottles are sometimes encased for packing. The Naples seeds are very large, but of a form that ought to grow; the dry-soil varieties may do better in our country. The test is surely well worth making.

In my boyhood, when large melons, known as nutmegs and musk-melons, were chiefly grown, a companion caught a rat in one by suddenly closing the hole which he made and through which he had entered to eat the seeds, leaving a piece of his caudal appendage sticking out as a tell-tale. Rats, mice and chickens curiously prefer the seeds of a cantaloupe to its flesh, while cats at provision stores will often eat the latter with avidity.

Philadelphia. ROBERT P. HARRIS, M. D.

CROSSING VARIETIES OF THE TOMATO.

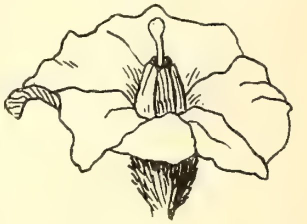


CROSS SECTION.

The Director of the Royal Gardens at Kew, England, made a public statement a few weeks ago to the effect that a knowledge of the science of botany is of no value to the practical gardener. It may be in doubtful taste to question the assertion of so high an authority, but the query arises in my mind, what would one accomplish at cross-pollinating plants who knows nothing of the parts of a flower, and of the functions of those parts? Possibly the dabbling with this sort of knowledge would be regarded by some as a sure evidence of a lack of practical ability. However this may be, I received a letter a few weeks ago from a practical gardener whose hair has grown gray in the business, inquiring if I could give him some simple directions for crossing varieties of the tomato. A sentence in his letter was somewhat touching: "My threescore years and over remind me that those younger than I are the proper persons to do this work, but I do not expect to fold my hands and wait my few remaining years." It occurred to me that there are possibly some among the younger readers of THE AMERICAN GARDEN who may be inspired to take up this noble work, and for the benefit of any such, as well as my aged friend, I have decided to offer my little experience.

The beginner is likely to meet with difficulty in securing pollen from the flowers of the tomato until he learns a little botanical secret. The same applies to the blossoms of the potato. If we refer in our Gray's Manual to the genus solanum, to which these plants belong, we shall find it stated that the anthers (parts that contain the pollen) open "at the top by two pores, or chinks." In the flowers of many other plants, as the strawberry, apple, lily, etc., the anthers burst at maturity and expose the pollen to view, but not so with the tomato. Just how the pollen makes its own escape through these little pores or chinks I do not know. We are sure that it does, however, for few flowers are more uniformly fertile than those of the tomato.

A reference to the drawings will perhaps be of some assistance. Not having a sample of a tomato blossom at hand, I have substituted a drawing of one of the potato, which resembles it sufficiently for our purpose. In the larger drawing, the stamens are seen in the center, clustered around the pistil. The chinks a their tips are not shown, as they are chiefly on the inner side. In the smaller drawing, however, which represents the stamens and pistils as cut across transversly, the little folds containing the pollen (marked *p. p.*) are easily seen. In order to secure the pollen, it is only necessary to insert a very narrow spatula, or the end of the tweezers, between the stamens near the base, crowding the edge of one out sufficiently so that the instrument may be inserted into the fold. Then by carefully



A POTATO BLOSSOM.

raising the instrument upward so that its end will pass through the whole length of the little fold and out at the top, it will be found laden with the golden yellow powder, if the flower is in the proper stage of maturity.

In the case of the tomato, it is better to remove the stamens of the flower we desire to pollenize before the petals open, to guard against self-fertilization; and to prevent pollination from other plants, it is well to inclose the flower, after removing the stamens, in a little sack made of soft paper. The following day, the sack may be removed and the pollen applied, after which the sack should be replaced.

I would invite the readers of THE AMERICAN GARDEN, of all ages, to make the experiment of crossing varieties of the tomato. My own experience in this work has developed some highly interesting facts, and others will no doubt be repaid for their work.

University of Wisconsin E. S. GOFF

THE TREE TOMATO.

CYPHOMANDRA BETACEA.*

THE tree tomato is widely disseminated over the earth and has attracted considerable attention in tropical and subtropical countries. Its value for commercial forcing in our northern houses is yet to be determined. It certainly possesses many promising features for this purpose, and is worth careful attention by those interested in supplying forced products.

The tree tomato is a native of South America, where over twenty other species of the same genus are known. It was long ago introduced into Jamaica, whence it has been distributed to many parts of the world. It has therefore been called the tree tomato of Jamaica, and under this name Peter Henderson & Co., introduced it four or five years ago. It is perhaps unfortunate that the name tomato should have attached to it, as it is entirely unlike any tomato, and there is also a well known and legitimate tree tomato in our gardens. On the other hand, the fruit is used in much the same manner as tomatoes are used, and as it is tree-like in habit, the name is to a certain degree applicable. In Jamaica it is known as tree tomato, and sometimes as vegetable mercury, from some supposed medicinal virtues. In Spanish America it is known as *tomato de la Paz*. I once grew it from seeds from Peru, where it is known under the name of *chileno tomato*.

The tree is a perennial, coming into bearing the second year from the seed, and continuing to bear, in tropical countries, for eight or ten years, or even longer. The fruit is reddish and somewhat egg-shaped at maturity, and attains a length of two or two and a-half inches. It is eaten either raw or cooked, in much the same manner as a tomato or egg-fruit. The plant attains a height of ten or twelve feet, and is of decidedly handsome appearance.

In culture it succeeds well either from seeds or cuttings, demanding in house culture only a loamy soil and common treatment. I have found no difficulty in growing good specimens, by wintering under glass, and in getting flowers in profusion; but I have not obtained the fruit. The flowers would uniformly fail to set. Unfortunately, I had no facilities for house culture at that time, and could not test them for winter fruiting. I apprehend no difficulty in fruiting specimens during another winter.

In general character the plant is closely allied to the egg-plant, and other large fruited solanums. Nicholson, in the Dictionary of Gardening, gives *Solanum fragrans* as a synonym for this cyphomandra, and gives its origin as South Brazil. The cu accompanying this (see page 409.) is adapted from a recent print in *Le Jardin*.

L. H. B.

(*) The following names have also been applied to this plant:
Pionandra betacea, Miers Lond. Journ. Bot. 1845, 358.
Solanum beteceum, Cavanilles, Icon. 6, p. 15, t. 524.
S. crassifolium, Ortega, Dec. 9, p. 117.
S. obliquum, Bertero, Pl. Exs. n. 1125.

EDIBLE TOADSTOOLS.

So widespread is the ignorance on the subject of edible toadstools, that the writer believes it possible that even the enlightened readers of THE AMERICAN GARDEN may find some new ideas in the following modest notes on the subject.

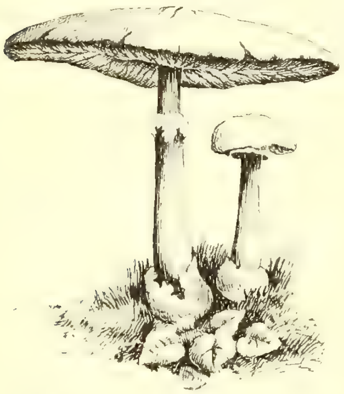


FIG. 1. POISONOUS MUSHROOM.

There are about a thousand species in the United States, classified under the following divisions: Those having gills or plaits under their caps, and called Agorics; those with spikes or mane-like protuberances under the caps, known as Hydnei; those with thousands of mouths on a sponge-like surface, called Polyporei or Boleti; those with the spore bearing surface tied up inside a cover, or Lycoperdons; the coral-shaped, or Clavariei.

No general test can be given by which a poisonous mushroom can be distinguished from an edible one, but they must be learned individually, as plants and fishes have been, for some varieties may prove wholesome to some people and indigestible to others.

In gathering toadstools, never twist them from the stems, but cut them off about an inch below the cap, and lay them down with the gills upwards; otherwise they shed their spores largely, and thus lose flavor. All mushrooms must be rejected that are shiny, acrid or otherwise nauseous, all that are not perfectly fresh when gathered, and all which have been kept longer than a few hours, as they spoil rapidly. As far as known, most of the serious cases of poisoning have been caused by the members of one genus, amanita, and although some members of the tribe are good, it is safe to avoid all toadstools which have the following characteristics: (1) A scurfy or warty top, which often rubs off and leaves the cap smooth; (2) a fixed ring around the stem, generally large and reflexed* in white-spored species: (3) a volva or collar around the base of stem, which generally remains in the ground when the mushroom is gathered. All amateurs are advised to let alone toadstools which have any sign of a volva; also not to rely upon the silver spoon or any such popular tests.

Fig. 1 gives the amanita or poisonous mushroom, which very closely resembles the *Agaricus campestris*, or mushroom proper of commerce. Fig. 2 represents the little puff-ball, *Lycoperdon sp.*, usually known by children as the Devil's Snuff-box, from the fact that in age the interior is mostly filled with snuff-colored dust.

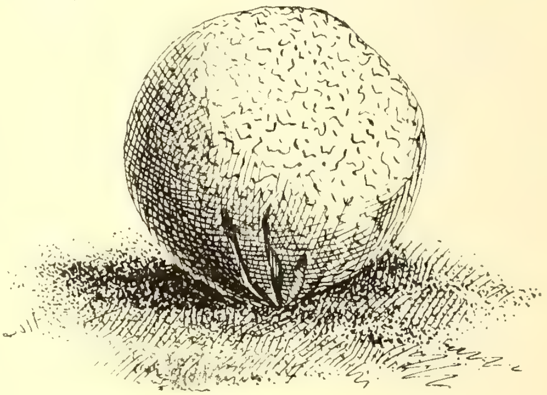


FIG. 2. THE PUFF BALL.

All white-fleshed puff-balls are edible, and when not showing any discoloration on being cut, will be pronounced by the most fastidious a great table delicacy. They may be cooked in many ways: cut into slices and fried, or put upon a buttered griddle; made into a batter with beaten eggs, or served as soup; prepared with milk as oysters are, and for this purpose they should be cut rather fine.

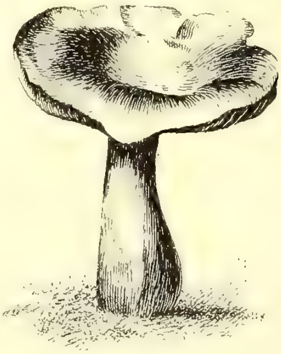


FIG. 3. RUSSULA NETEROPHYLLA.

Fig. 3 is one of the russulas (*Russula neterophylla*). It is of a drab or mauve color; cuticle very thin, peeling from the edge, but adherent towards the center; bell-shaped at first, but finally the center of cap becomes depressed. The gills are rather dusky in color, brittle, breaking

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**Agaricus campestris*, the edible mushroom of gardens, has a *movable* ring.—ED. AM. G.

into unequal segments if pressed. The stems are stout and solid, generally tapering to a point at base, but some gathered by the writer, which were of a very fine nutty flavor, bulged out on one side, as in the illustration. They grow in woods, woody paths or clearings. All russulas should be tasted raw, and those rejected which are hot or acrid. Cook for a few moments with butter, pepper and salt, on a gridiron.

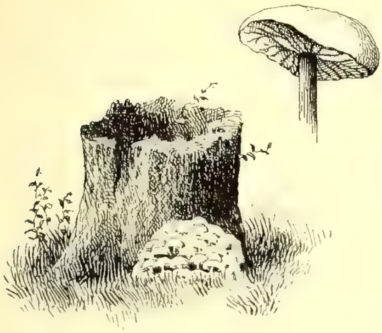


FIG. 4. A COMMON MUSHROOM.

Fig. 4 is a very common mushroom, growing in crowded bunches upon decaying stumps. The flavor is very nutty and delicate, and it makes a good dressing for beefsteak, or it can be served alone; in either case, it should be cooked upon a gridiron. The cap is light brown, with a tendency to split open in the center, showing the white flesh beneath. Owing to their crowded manner of growth the cap assumes various shapes in age, but the young mushroom is of the true button type. The stems are long, thin and rather stringy.

Fig. 5 is one of the coral or Clavariei fungi. This is a very easily distinguished mushroom, and a very common one in damp woods. During a rainy spell it may be gathered by the peck in many parts of this country. They do not look very inviting to the uninitiated, but when once tasted are generally pronounced very good. They grow in bunches three or four inches high, and look, as their name indicates, like sprigs of coral stuck into the ground. Those eaten by the writer were of a dark cream color. Most brightly colored ones are said by some writers to be edible, and the bold may try the experiment, but the timid will most certainly let them alone.

Fig. 5 represents the finest specimen ever found by the writer. It was growing at the foot of a pine tree. Sometimes it grows in clay or clayey sand. It closely resembles brain coral in its convolutions. It is cream color, shading into brown. The flesh is firm and white, having the taste and consistency of a half-ripe chestnut. No recipes can be given for the cooking of this "find," as not having any books at hand to prove its respectability, it was never allowed to grace the dinner table, and the writer could only enjoy it in small quantities eaten raw. He knows personally that it is good! L.

Charleston, S. C.

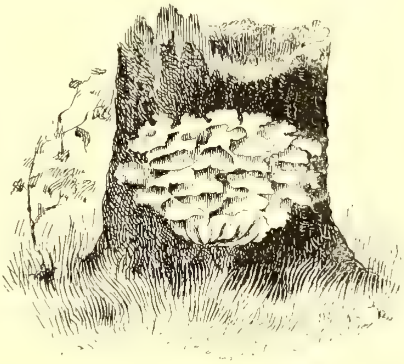


FIG. 5. THE CORAL MUSHROOM.

APPLES FOR SOUTHWESTERN MICHIGAN.

W. A. Brown, a leading fruit grower in the lake shore fruit region of Michigan, makes the following timely observations in the *Allegan* (Mich.) *Gazette:*

While most growers will prefer the old standard varieties for our market, I believe the western markets are being educated to appreciate quality in fruits. Many of our best dessert apples are subject to scab and cannot be grown profitably for market. Among these the Red June, Early Harvest, Williams' Favorite, Fameuse, Belleflower, Red Canada, and Swaar are some of the best, but are generally deformed and unprofitable. The Astrachan and Oldenburg are not dessert apples and do not always produce fair fruit. The Oldenburg has obtained the reputation of being one of the most hardy trees grown, and has been extensively planted throughout the northwest, in locations where the better varieties are sure to fail. There is a growing demand for "fancy" good eating apples, and being located for growing and marketing the fine varieties, the selection of varieties is of much importance to our growers. Washington Strawberry, though not always prolific, is a good early apple and is one of our fancy fruits.

Among the new sorts I would place the Shiawassee first. It originated in Shiawassee county, and is almost a duplicate of the Fameuse (Snow), being the same in season and quality, but is different in form, being oblate, and as grown by myself, Mr. Lyon, and others, is a constant bearer of most beautiful fruit, and is free from blight and scab, which so often ruins the Fameuse. The Orange Pippin is a new variety from New Jersey.

It has proved a uniform bearer of perfect fruit with me. It ripens with the Maiden's Blush and is in every way superior to this famous old variety.

After the Shiawassee I would place the Hubbardston. It is one of our smooth, perfect apples, of good quality, and comes in late fall and early winter, when a good eating apple is in demand. Many of our people place the Baldwin first, but Michigan and Western New York have more Baldwins in prolific seasons than of all other varieties; and while planters have generally planted the long-keeping varieties, I believe that future planters in Berrien county will find the earlier fancy varieties.

THE IRESINES OR ACHYRANTHES.

GOOD FOLIAGE PLANTS FOR ALL SEASONS.

THE several species or varieties of iresine, or, as they are occasionally called, achyranthes, form when taken together a very beautiful genus of stove or warm greenhouse plants, belonging to the natural order Amarantaceæ.

They are plants of rather succulent habit, growing about two feet in height, having richly colored foliage, which varies in the different varieties from dark crimson to golden yellow. They are of rapid growth and of the very easiest cultivation, and I consider them among the most useful of ornamental-leaved plants. They can be used to advantage during the summer for bedding purposes, and some varieties will be found very useful to mix with plants having light-colored foliage, while large single specimens appropriately placed in the mixed border will brighten it up, and render it more attractive during the late summer and early autumn months.

The iresines can also be used to good advantage for the decoration of the warm greenhouse during the winter season; and as they are much hardier than the coleus, they can, with a little care and attention, be grown in an ordinary sitting-room during the winter, and this renders them excellent window-garden plants. When used as bedding plants or for decorative purposes during the summer season, they should have a deep, moderately enriched soil, and, if at all possible, a sunny situation, although they will do well if grown in partial shade. They should be placed about one foot apart, and pinched back occasionally so as to keep them in their proper place. For outside use young plants should be obtained as early in the season as possible, and grown in small pots until the weather becomes warm and settled, when they can be planted outside.

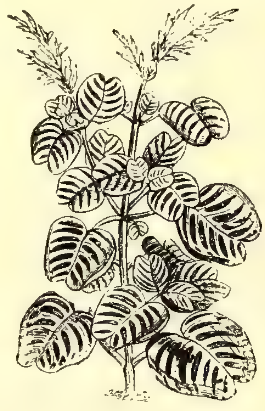
Where fine specimens are desired for the decoration of the conservatory or window-garden during the winter, they should be grown especially for that purpose. The young plants should be placed in a nicely prepared border, at least two feet apart, and grown carefully during the summer. They should be freely pinched back, so as to make compact specimens, and staked if necessary. Early in September they should be taken up and potted. In potting, use porous or soft-baked pots; let them be proportionate to the size of the plants, and see to it that they are well drained. Give them a compost composed of two-thirds well decayed sods, and one-third well decomposed manure. The plants should be placed in a light, sunny situation, and given a temperature of from 50 to 55 degrees. Water must be given frequently, but one should avoid keeping the plants too wet at their roots. It is well to sprinkle them freely overhead during bright, sunny weather, so as to guard against the attacks of the red spider, as this pest often infests the leaves in such numbers as to cause them to drop off.

Propagation is easily effected by cuttings of the half-ripened wood, placed in sand and given bottom heat. If the young plants so obtained are rooted early in the season and liberally cared for, good specimens can be readily obtained. The following are the most distinct and desirable sorts:

I. Caseii has leaves acuminate and of a bright golden yellow, veined with green. It is a strong-growing variety, of spreading habit, seldom exceeding one foot in height.

I. Collinsii has leaves lanceolate in shape and beautifully marked with yellow, pink and green, the yellow predominating. The stems and midribs are crimson. The plant is of strong, upright, compact growth, attaining a height of over two feet. It is one of the most distinct species yet introduced.

I. Emersonii has leaves lanceolate in shape and of a light red color. The stems and midribs are pink. The plant is of compact habit, growing about one foot in height.



IRESINE HERBSTII AUREO-RETICULATA.

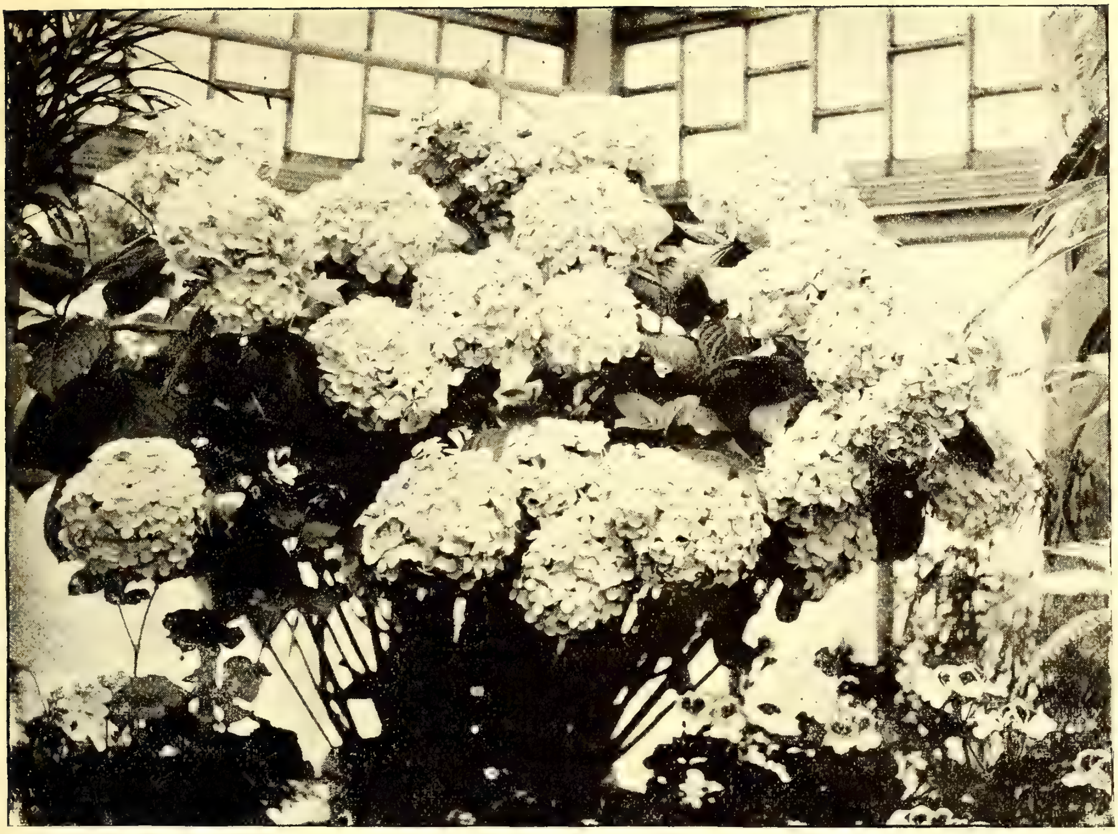
I. Hoveyi has large leaves, acuminate, of a carmine color, shaded with dark and light pink. The plant is of spreading habit, seldom growing more than one foot in height.

I. Lindenii has leaves lanceolate in shape and of a deep blood-red color. The plant is strong and compact in habit, seldom growing over one foot in height.

I. Herbstii aureo-reticulata (*A. Verschaffeltii*) has foliage beautifully reticulated with green and gold, and stems of a bright, transparent carmine. The plant is of a dwarf, spreading habit, and is an old but beautiful and distinct kind. The cut represents this species.

I. Wolseyii has small leaves of a dark, metallic crimson color. The plant is dwarf and compact in habit, and grows about eight inches in height. It is one of the best for the window-garden. CHAS. E. PARNELL.

Queens County, N. Y.



HYDRANGEA OTAKSA.

A JAPANESE GEM.

The illustration is from a photograph of a plant of *Hydrangea Otaksa* growing in the Cornell University conservatories. This plant is about six years old, and at present occupies a 16-inch pot and supports 46 flower clusters, the largest of which are about eleven inches in diameter. The plant measures 4 feet 7 inches in height and 5 feet 4 inches in diameter as staked up, which of course is much less than it would measure if allowed to take its own way. The plant has received only ordinary care, the method of treatment being as follows: When through blooming it is removed from the pot and planted out in the garden, mulching the soil around the plant. If the season is dry the plant is watered occasionally. As soon as cold weather sets in, it is taken up and potted, using a soil composed of three parts turfy loam and one part decomposed cow-manure. It is then placed in a cold frame and watered occasionally, taking care not to give too much. While in this situation give all the air and sunshine possible, in order to procure thoroughly ripened wood, which is absolutely essential to the best flowering qualities.

About January 1st it is brought into the greenhouse, where it has a night temperature of 50 degrees, and 10 degrees higher in the day time. It is kept in this house until the flowers are well formed; then remove to a warmer house, receiving a temperature of about 55 at night and 65 during the day. It is then watered more freely and fertilized with manure water twice a week. The plant needs to be syringed twice or three times a week to keep down red-spider. The green-fly bothers it sometimes, but is easily kept in check by fumigating. Otherwise it is a plant which is easily managed and ought to be more extensively grown.

As a decorative plant, it has few equals. It is also particularly valuable for outside in summer if wintered over in a cold frame or a cool cellar. It is not only showy and attractive but remarkable for the length of time during which it remains in flower.

It is easily propagated by cuttings of the young wood, preferably taken during February or March. When rooted, place in small pots and shift to larger ones, when these get full of roots. Put the plants outside when the weather will permit. Plunge the pots in coal ashes to avoid rapid drying out and to prevent worms from entering the pot. Keep the plants well watered. If properly attended as regards repotting and watering, they will be ready to be put in an 8-inch pot by fall, and will make nice flowering plants by spring. From this time on the treatment is the same as that already described for old plants.

It may be a matter of interest to note that of six plants the same age three were removed from the pots and planted out during the summer while the others were kept in pots continuously but plunged in the ground during summer. The three which were planted out, the one illustrated being one of them, have done much better. The others produced fewer and smaller flowers and a great proportion of blind wood.

Robert Shore.

[Note.—*Hydrangea Otaksa* is considered to be a variety of *H. Hortensia*. It was figured and described in France so long as 1868, in both *Flore des Serres* and *Revue Horticole*. It is of Japanese origin. This is one of the finest of all cultivated plants, and our illustration represents an excellent specimen.—Ed.]

GESNERAS AND THEIR KIND.

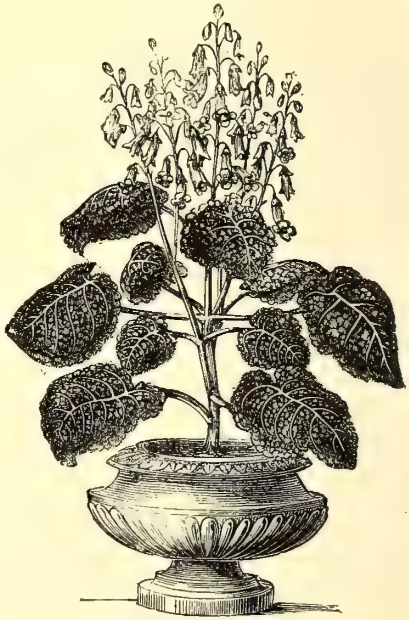
NOT MUCH GROWN, BUT WORTHY OF TRIAL.

WHY is it that this class of plants is never mentioned in our horticultural periodicals? Why are they not included in the catalogues of our florists? They certainly are deserving of culture, and afford a variety of very charming flowers. I admit that they are of a tender character, and I would not recommend them to the novice in the culture of rare plants. I have made several unsuccessful attempts to grow them; but I think the failure was on account of the small size of the plants, as they had been sent by mail. Last spring John Saul, of Washington, D. C., the only florist who to my knowledge catalogues them in their different sections, sent me, on special order, well-established and thrifty plants by express. They came in fine condition; one was in bloom, and the others beginning to bud.

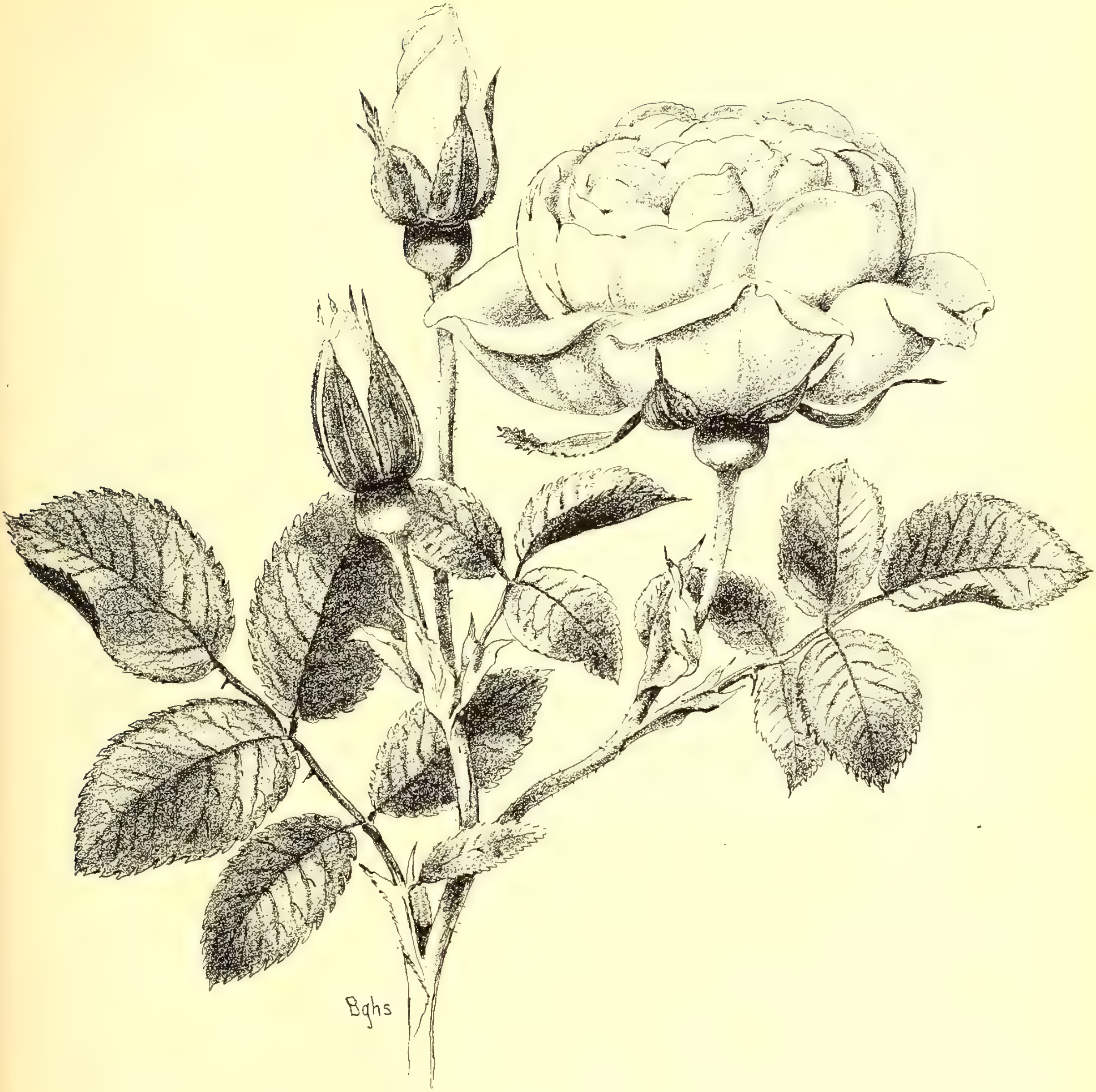
Mr. Henderson, in his Hand-book of Plants, thus describes the gesnera, so named in honor of Conrad Gesner, a celebrated botanist of Zurich.

"A beautiful and extensive genus of tuberous-rooted greenhouse plants from Mexico and South America. They are remarkable for the beauty of their foliage, which is singularly marked and as soft as velvet, and for their long spikes of brilliant colored flowers, mostly scarlet and yellow. Some of them are singularly spotted or marked. With a little care in regulating their season of rest, they can be brought into flower at any desired time. They require a light rich soil, a warm situation, but little sun, and plenty of water, which should not touch the foliage. They are easily propagated by cuttings of young shoots, or by cuttings of leaves with a bud at the base, division of the tubers, or from seeds. The latter is a very interesting plan. The seed should be sown in March in pans or boxes, in fine light compost, largely composed of sand. Place the pans in a warm, moist atmosphere. As soon as the seedlings are up and commence the second leaf, transplant them separately an inch or two apart, in shallow boxes, and from these when sufficiently grown, remove them singly to small pots. In the autumn allow them to rest. As soon as they show signs of life in the spring, repot them in fresh soil, water, place in the light, and many of them will flower during the summer."

The following I think can be easily made to bloom during the winter months. *G. alba rosea*, rosy, creamy-white, carmine throat on yellow ground; *G. Diovati*, with large flowers, orange-scarlet tip, spotted, free grower and profuse bloomer; *G. Hendersonii*, the finest of all, a true gesnera, with pale green, velvety leaves, and a large truss of brilliant scarlet flowers, three inches



Gesnera refulgens.

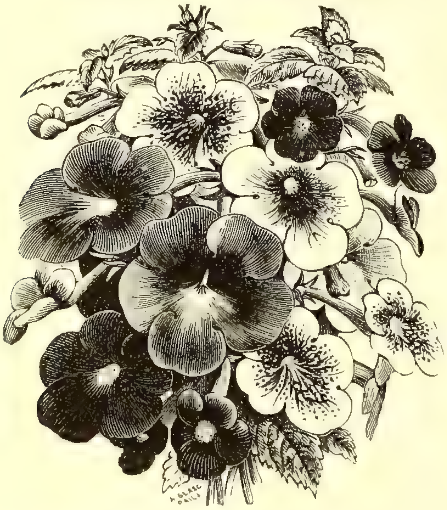


The Georges Bruant Rose ; From Nature ; Natural Size. (See page 422.)

long ; *G. Jasminiflora*, pure white ; *G. refulgens*, a superb winter bloomer, color between vermilion and amaranth ; *G. Hansteini*, white, shaded and spotted with violet ; *G. citrina rosea*, half yellow, half rose.

Achimenes or Eucodonias belong to the same family. The flowers are produced on large terminal cone-shaped racemes, in drooping funnel-shaped tubes. Amphitrite has flowers of lilac-rose, with three bands of orange-yellow. Those of Diane are lilac-blue, with yellowish throat. Those of nageliodea lilacina are lilac with a white throat, spotted and freckled with citron, yellow and lilac. Van Houttei bears large spikes, perfect in form ; vivid scarlet, spotted with flesh-colored stripes.

Nægelias belong to another section of the family, and are very similar in habit to the others. *N. amabilis* (or properly *N. multiflora*) has fine panicles of snow-white flowers, with large lemon-yellow spots on the lower lip. Daphne bears rose-colored flowers, with a pure white center ; those of Sceptre Cerise are bright vermilion and cherry red, covered with golden yellow spots—magnificent and very large ; it has smooth foliage of bronze-maroon. In Gabriellas, flowers are carmine bordered with white, and the throat is pointed with carmine on a yellow ground; an extra fine variety


GROUP OF ACHIMENES.

PLECTOPOMAS form a section of hybrid gesneras, considered by some botanists as a distinct genus. There are not more than a dozen varieties named under this head, and their colors are salmon, rose, white, blue and crimson, flaked, blotched and dotted, similar to those already described.

TYDÆA is one of the natural order of gesneraceæ. It is a native of the mountains of Grenada. The group includes both autumn and winter blooming varieties, producing a long and brilliant succession of flowers, in color like those of the other classes.

Belzebath, which is now blooming in my window, has a crimson tube with the lip curiously spotted with dark maroon. In those of Gigantea, flowers are vermilion and gold. In Madame Halphen the lower lobes are lightly tinted with blue, and spotted with carmine, while the upper lobes are shaded with carmine-rose. Elliptica multiflora is dark purple with white spots. Wonder bears magnificent flowers of a dazzling vermilion veined with black. All these are plants of great beauty, and I hope some of the GARDEN readers will be induced by my descriptions to seek a more intimate acquaintance with their merits. The whole family of gesneraceæ will be found unusually attractive, and out of the common run of plants. MRS. M. D. WELLCOME.

Maine.

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PANCRATIUM OR HYMENOCALLIS.

NOTES FROM TWO ADMIRERS.

THE pancratium lily is one of the most useful of all the lily family for an amateur to grow. It is of the easiest culture; is not at all particular about having the choicest place in the room or greenhouse, and appears to grow equally well in almost any kind of soil. I have seen large clumps of it four or five feet in diameter. and as much in height, in the gardens in Florida, where the soil was apparently nothing but sand. Plants for greenhouse decoration appear to give most satisfaction when grown in sandy loam, with about one-third peat, and always plenty of drainage. When growing, they require abundance of water, and a tropical heat, if it can be given them, although an ordinary greenhouse temperature will answer nearly as well, and the flowers will last longer than if grown in a higher temperature. The fragrance is delicious, something like that of the lily of the valley. The individual flowers do not last long but from a large plant a succession of flower-stems is produced, which prolong its season of flowering for some weeks. In appearance, the plant is very much like some of the crinums. They can be partially dried or rested, the same as many others of the lily family. They all respond very readily to good treatment, and will amply repay the same attention usually accorded to the *Eucharis Amazonica*. The species well worth growing are *P. verecundum*, *P. maritimum* and *P. Illyricum* for a cool greenhouse. SAMUEL HENSHAW.

Pancratium are among the old plants undergoing a revival of popularity. Once so common as to give way to newer things, they are comparatively unknown to the present generation of plant growers, who, in turn, are just beginning to admire them for their great beauty.

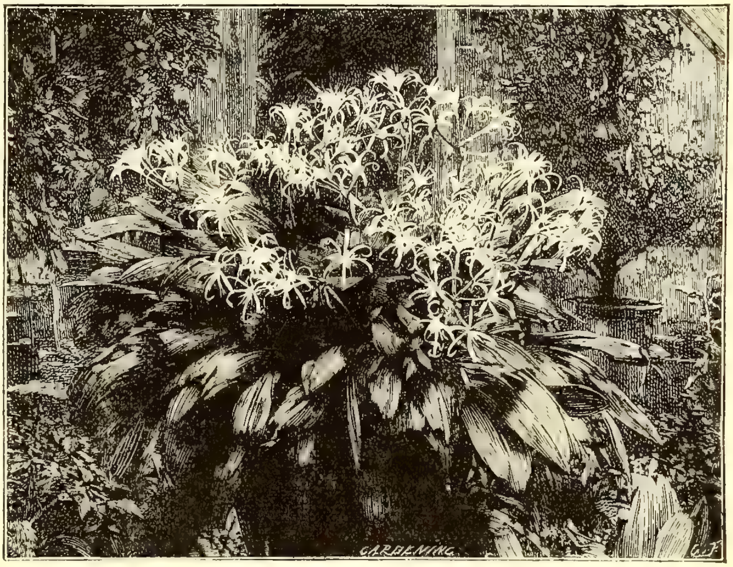
Pancratiums and hymenocallis are two genera so nearly allied that for garden purposes they are synonymous. They are mostly natives of regions bordering on the tropics, and such kinds require greenhouse cultivation; but there are several kinds that flourish in the open ground wherever it does not freeze much below the surface. In some of the old gardens in our southern states delightful clumps of them flourish to perfection. We are told that the plant is abundant in the gardens of the "Hermitage," Gen. Andrew Jackson's residence, and is there known as the "August Lily," from its time of blooming. The species is probably *Pancratium rotatum* (*Hymenocallis rotata*), which is described as flourishing in the open air from Texas to Tennessee, and in all the southern sea-board and Gulf states. Never have we seen a more beautiful sight than once when we came suddenly to a small, wet prairie in Florida that was dotted with these "Fairy Lilies"* as thick as the field in our national flag is starred with the representatives of the states.

It has a greater number of names than any other plant we can recall. Besides those already given, it is known, in common with other pancratiums, throughout the south as "Spider Lily," and its trembling flowers, stirred by a gentle motion, are suggestive of an uncanny insect; but its delicate texture and pure-white flowers make "Spirit Lily" a more pleasing name to many. Some people call it "Tape Lily" from the tape-like extensions of the corolla. It is found along the lines of railroads, probably from its being able to increase in the disturbed soil, and so has become known as the "Railroad Lily." Who but a "cracker" could have dubbed it "Crow Pizen"? Still, we never knew of its being harmful to any of the feathered tribes.

For some time after opening, the ray-like formations of this species attached to the cup of the corolla extend perfectly straight.

Pancratium rotatum generally opens in the evening. The divisions of the perianth open first along the middle portion, gradually parting towards the tip, and at last, as soon as detached, instantly snap away from each other, outwardly, like so many springs. One must watch closely to see them open, the motion is so rapid. They are apparently easily grown. The height of this species is from one to two feet, and, like most of the pancratiums, its pure white flowers yield a delicate and refreshing perfume, said to be especially pleasing to invalids.

Pancratiums are among the plants that flourish by being left alone when once established. In the open air, most kinds will form large clumps and bloom abundantly. The less repotting they get, the better they thrive until they become so crowded that they must be removed into larger pots. Then carefully cut away the dead roots. They like a light situation and sandy soil.



PANCRATIUM AMŒNUM.

For pot plants, loam and peat or decayed leaf soil, with plenty of sand, are good. They enjoy moisture, and, even when resting, should not be allowed to become dry; drainage, however, should be secured.

P. Illyricum is hardy in many parts of England, and doubtless can be established in many places in our own land. *P. maritimum*, which comes from the countries around the Mediterranean Sea, is already at home here, and is commonly known as "Sea Daffodil." Our picture of *Pancratium amœnum* was made from one which at one time bore 20 spikes of bloom, aggregating 212 flowers. Of these, 130 had been picked off when the photograph was taken.

D. W.

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* The name "Fairy Lily" is also given to the Zephyranthes.

TWO HUMBLE FLOWERS.

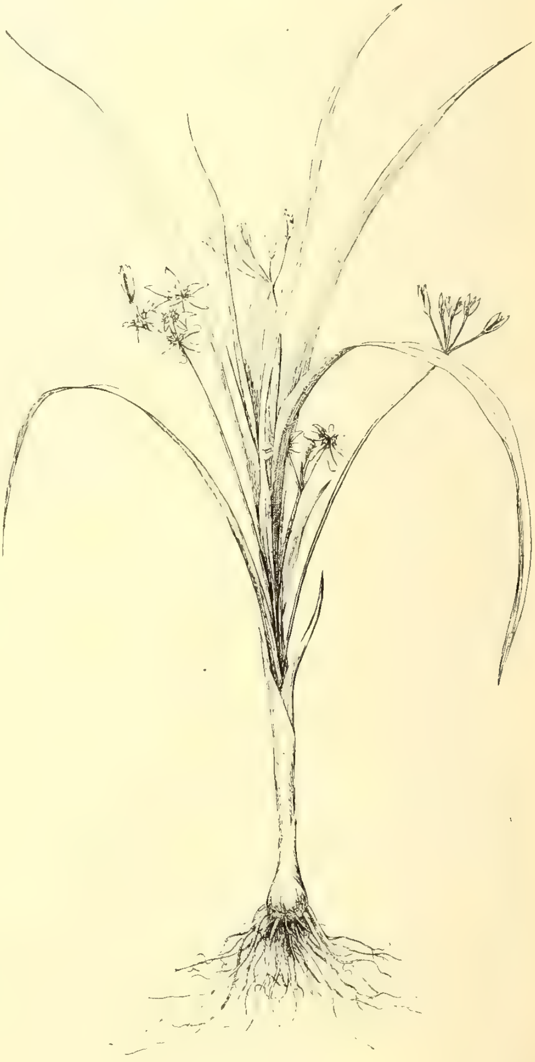
IN FLORICULTURE as in all else, the tendency seems to be toward that which makes the most show. People need to be educated to know that there is pleasure in little things. Perhaps it was for this, that such flowers as the humble hypoxis were placed among the more pretentious ones in nature's garden. It is a plant worthy of notice and even of cultivation. I was so much attracted by its cheerful little blossoms last spring, that I procured a bulb and transplanted it to my garden, where it bloomed unconcernedly.

It grows from six to eight inches high, several scapes arising from the same root, each about four-flowered, dividing at top into an umbel with a short peduncle for each golden star. The blossoms have a curious way of opening, the three outer segments opening first, leaving the three inner standing upright. The former differ somewhat from the latter, being a trifle herbaceous upon the outside, though each division is slightly greenish underneath, and all are of a beautiful golden yellow above. Its six stamens are crowned with pretty arrow-shaped anthers. Its leaves are narrow and grass-like, all radical, somewhat hairy, as are also the slender flower scapes and under portions of the perianth.

This golden star-grass is a bright little thing, and well worthy a place among early flowering plants. It comes into bloom in May and continues through early summer. As it grows upon moist land, it might be made to brighten some out of the way corner, too damp for ordinary plants. Although such a humble plant, it belongs to the pretentious family of amaryllis. It is known in the botanies as *Hypoxis erecta.*

Indian Cucumber Root (*Medeola Virginica*) is an interesting plant found sparingly in this vicinity. The name *Medeola* is derived from that of the fabled sorceress Media, because it was anciently supposed to possess great medicinal properties, a claim wholly ignored by scientists of the present day. Gronovius received the first of its kind from Virginia, hence its specific name. Its white fleshy rhizome is thought to have something the taste of a cucumber, a fact from which it derives its common name. It belongs to the family of trilliums, and is a most interesting plant.

It has a simple, slender stem which grows from one to two feet high, covered with a loose white substance which resembles wool. About midway it bears a whorl of from six to eight sessile, parallel-veined leaves, obovate-lanceolate in form. At the top is another row of only three leaves, ovate, and considerably smaller. In the axil of each is produced a pendulous greenish yellow flower with six recurved segments. The petals and sepals are alike both in form and color. The short anthers are borne upon slender filaments. The most noticeable parts of the flower are the straggling stigmas,



Hypoxis erecta.

three in number, of a reddish-brown color, and exceeding in length the sepals and petals, presenting a most remarkable appearance. The flower is followed by a dark purple berry, three-celled but few-seeded. This medeola is a plant decidedly worth more attention. S. E. KENNEDY.

THE OVERSHADOWING OF OUR HOMES.

THE DANGERS OF CLOSE PLANTING ABOUT LIVING PLACES—FEARS OF ARBOR-DAY PLANTINGS—THE TESTIMONY OF A PHYSICIAN.

NO ONE raises a word against our Arbor Days, and few protest against dense shade about dwellings. Arbor-day planting is generally confounded with forestry, with which, in fact, it has no relation. The following remarks by W. Thornton Parker, M. D., in the *Sanitarian*, are timely and needful.

For many years our people have given considerable attention to the subject of forest culture, but instead of exercising their influence in the direction of forest protection and increase where it is most needed, many seem to content themselves with planning "arbor days" and employing our school children in planting trees and shrubs in parks and school grounds and streets of our cities and towns. To witness the faithful efforts of our children as they plant the trees where sunlight is most needed, one cannot help feeling that oftentimes these efforts are sadly misdirected and the theory taught is not the true one. This love for the beauty of foliage is right and natural, and properly guided is to be encouraged, but it has undoubtedly been only too often extravagantly bestowed, and the societies formed for this purpose are not always under the direction of the wisest. The planting from a sanitary point of view has not yet received much attention. To set out as many trees as possible seems to be the object, and this is limited only by the means and the amount of land at their disposal. The poem of "Woodman, Spare that Tree" has won a strong place in the hearts of the people, and while whole forests disappear as if by magic, in ruthless waste and in serious menace of health and life, the tree in the town, whose roots are bathed in poisonous soil, and whose branches are filled with deadly vapors, and whose leaves repel God's glorious sunshine, stands triumphantly, a delusive ornament and a dangerous menace. So much has this natural love for the beauty of foliage been misdirected that many sicken and die from overshading—even as many must also suffer from the wanton destruction of our forests.

The past nine months of this eventful year of 1889 have been remarkable in the lessons they have furnished sanitarians and hygienists. As might well have been expected, the past ten or twelve weeks have furnished a large death-rate from causes preventable, which must act as a warning for all who are interested in the welfare of the country. I do not hesitate to affirm that this death-rate is owing to the overshading of our homes in very many instances. Each community has its proportionate share of value in health and homes. Whatever diminishes this value is a direct injury to that community. Overshading is a serious fault, and directly lessens the value of real estate, and noticeably increases disease and shortens life. These facts should receive careful and positive attention from thoughtful people.

Vegetation produces a great effect upon the movement of the air. Its velocity is checked, and sometimes in thick clusters of trees or underwood the air is almost stagnant. If moist and decaying vegetation be a coincident condition of such stagnation, the most fatal forms of malarious diseases are produced. A moist soil is cold, and is generally believed to predispose to rheumatism, catarrh and neuralgia. It is a matter of general experience that most persons feel healthier on a dry soil. In some way, which is not clear, a moist soil produces an unfavorable effect upon the lungs. A moist soil influences greatly the development of the agent, whatever it may be, which causes the paroxysmal fevers. In ground which has been rendered dryer by drainage, Buchanon has shown that there has been a diminution in deaths from phthisis (consumption).

Houses overshaded are not healthful, no matter how commodious or well built they may be. Too many trees near sleeping and living-rooms exercise a very injurious influence and induce various diseases, notably rheumatism, heart disease, consumption, general debility and anæmia. It would seem as if these truths must be too well known to need any statement. But it has seemed to me, in view of the increasing foliage of our towns, necessary to call them again to your remembrance and to ask you to consider the whole subject as one well worthy the attention of those interested in American public health. A journey through many of our towns during the past nine months, and an experience covering twenty years of professional investigation, have convinced me that this most undesirable condition of overshading is only too common, and has become a positive injury in almost every direction. The results are, in point of fact, much more serious than most people seem to be aware of; indeed, the ignorance or indifference generally noticeable whenever sanitarians make a move in the interests of public health is deplorable.

A soil loaded with roots and densely shaded is unfit for man to live upon constantly, and is certainly no place for a permanent home. The air entering the bedrooms and living-rooms from such surroundings is chilly and dead, and is not at all suitable for respiration. Such an atmosphere cannot bring health to invalids, and is dangerous to the well. It is invariably productive of sickness and even death, especially among children and those of feeble constitution.

As man pales, sickens and dies without the blessing of the sunshine, so, too, the earth deteriorates and becomes unfit as a safe resting-place for man if it is deprived of the requirements of nature. It frequently happens that physicians are called to prescribe for ailing people who seem to possess every comfort and luxury, and yet who are really perishing because their houses and grounds are overshaded. These people who live in such houses are always cold and miserable, needing extra clothing and expending great quantities of fuel in order to obtain the needed warmth and to dispel the deadly chill. Artificial heat can never be compared reasonably with the pure life-giving sunshine, and human science can never discover a substitute for the divine light of health and life. Where houses are overshaded the nervous system also suffers, as well as the general bodily health; mental disturbance, melancholy and madness are to be apprehended from such dreary surroundings. No one will pretend that the sanitary condition of the majority of our summer resorts are at all equal to what they should be, or to what the public has a right to demand.

As a local board of health has a right and duty to close a house injurious or dangerous to health and life, and to forbid its occupancy until reasonable sanitary requirements have been observed and causes of danger removed, so it would almost seem to be a reasonable inference that a national board of health should have power to discipline summer resorts and other localities, and prevent the seekers for health and pleasure from risking their own and their children's lives in places desperately neglected, unhealthful and dangerous.

Many such places exist, where overshading is the greatest obstacle to needed sanitary reforms, and where, indeed, little can be accomplished for the future sanitary improvement of the place until the axe has been given full sway and sunlight admitted to disinfect the foul earth.

> "Oh, that one ray of golden light
> Could pierce this never-ending night!"

cries the prisoner in his dark and dreary dungeon. Can we not as physicians feel the warmest pity for those who are deprived of the blessed sunlight? Do not the stories of the captives and victims of Russian cruelty appeal to us more strongly when we think of their dark and sunless existence? Light and life are the divine gifts; death and darkness the portion of those who hate the light.

THE GEORGES BRUANT ROSE.

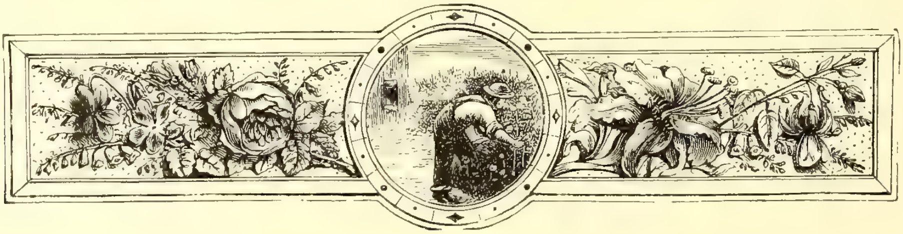
This is the second season that the new rose, Georges Bruant, has bloomed in our experiment grounds. It is the first known cross between a tea rose (Sombreuil) and *Rosa rugosa*, the first cross of any kind with *Rosa rugosa* having been effected by the *Rural New-Yorker* nearly two years previously, the hardy rose, Harrison's Yellow, having then been used as the pollen plant.

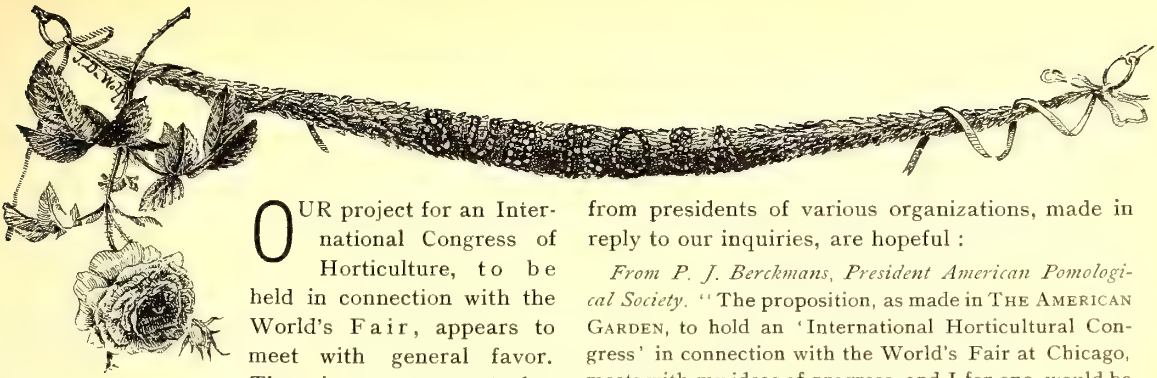
G. Bruant, in so far as the buds and flowers are concerned, is a decided success. The buds are pointed, as our illustration from nature shows, and they unfold not unlike the teas, Niphetos for example. As the bud opens more fully, one is reminded of Gen. Jacqueminot, while, as may be seen, again glancing at the illustration (page 417), the full-blown flower is almost its counterpart, save in color, which is a pure white.

We may not speak in positive terms as yet respecting this rose's foliage, habit, blooming period and hardiness. Two large pot-grown plants were received last year, one from Ellwanger & Barry, the other from The Storrs & Harrison Co. Neither bloomed. Both were wintered in a cold frame, and though somewhat injured during the winter, both are bloomng freely now.

The habit seems a trifle leggy, the foliage scanty. The leaflets—usually five—are smaller than those of Rugosa and less leathery, though the closely netted veinlets, so distinctive a feature in the beautiful leaflets of Rugosa, are quite well defined. The odor of the flower is rather that of Rugosa than of the teas. The smaller and more closely-set thorns of Rugosa are wanting, while the larger thorns are more rigid and not less numerous. A third plant received from Peter Henderson & Co. this spring in fine condition is now badly mildewed, while the others have suffered as much from insects as the hybrid remontants among which they are growing.

Given a more vigorous growth and a closer habit, which it may still be found to possess under more favorable conditions, Georges Bruant must be considered a very valuable acquisition. E. S. C.





OUR project for an International Congress of Horticulture, to be held in connection with the World's Fair, appears to meet with general favor. There is every reason to believe that a larger and better exhibition of horticultural products and devices than the world has yet seen could be perfected at Chicago. And from this exhibition there should spring a completer and broader study of horticulture than has ever been made. The horticultural interests of a World's Fair are worthy of a broader conception and treatment than our horticulturists have proposed for them. We do not want a show, merely, neither a mighty and fulsome conclave of societies and men. But we need to make a broad study of plant variation, of the adaptabilities of plants to all conditions of culture and climate, of species and varieties, and of all other points in which the knowledge of plants touches the welfare of man. It is only with the opportunities which a great national and international congress can provide that such reports and monographs can be made. In other words, there should be a great ulterior aim in the project; but this seems to be farther above the conception of some advocates of an horticultural exposition than are the clouds above the tree-tops.

It is evident that the leadership of this great enterprise should fall to the Department of Agriculture, for the department alone can furnish the inspiration and the impetus; and it could publish the results. The department would need to call upon many specialists, to be sure, but coördination and headship must reside in it. The Chicago Florists' Club has presented its president to the World's Fair authorities for "commissioner of horticulture," and the Nurserymen's Association has endorsed the action. If it is intended that this "commissioner of horticulture" shall act as a local officer to manage the local business of the exhibition, the movement may be a wise one; but if it is expected that he shall assume the whole leadership of the enterprise, it is fatal. The boldest comprehensiveness should characterize this endeavor—must, indeed, if success is to come.

All our national societies must unite in this enterprise if the best is done. The following letters from presidents of various organizations, made in reply to our inquiries, are hopeful:

From P. J. Berckmans, President American Pomological Society. "The proposition, as made in THE AMERICAN GARDEN, to hold an 'International Horticultural Congress' in connection with the World's Fair at Chicago, meets with my ideas of progress, and I for one, would be happy to see such a scheme inaugurated. We may fail to secure adequate attendance when there is a 'bigger show' to draw from the material which should rightly form that of a scientific assembly. We tried to have a session of the American Pomological Society during September of 1876 at the Centennial Exposition at Philadelphia, but failed to secure sufficient members. Now if we can arrange such a programme as will secure a respectable attendance in point of numbers, and overcome the only obstacle which, in my past experience, has always proved a stumbling block, then I see no difficulty in the way of a hearty coöperation of the American Pomological Society."

From Parker Earle, President American Horticultural Society: "Your suggestion is timely. I have considered the matter of holding a meeting of our society during the World's Fair. I should be glad to make the meeting what you suggest, an 'International Congress of Horticulture.' Yes, the American Horticultural Society will gladly coöperate with any and all other kindred societies for such an assembly of the horticultural forces. This society organized and conducted the first and only large international horticultural exhibition ever held, in New Orleans, in 1884–5; and it may do a similar work here. In any case, a great meeting will be useful."

From George A. Sweet, President American Association of Nurserymen: "I heartily concur in the proposition to hold an International Horticultural Congress in connection with the World's Fair, and will do all in my power to have the American Association of Nurserymen participate."

From J. M. Jordan, President Society of American Florists: "Conventions are of great benefit to any one, and especially to the horticulturist; and I would most earnestly recommend the holding of an International Congress. I should advise that the Society of American Florists join in the congress. I am of the opinion that the move should be inaugurated by the Department of Agriculture; then the reports could be transmitted and circulated to the great masses of horticulturists.

From H. W. Johnson, President American Seed Trade Association: "So far as I am personally concerned, I think it would be a splendid idea to have a Horticultural International Congress in connection with the World's Fair, and have no doubt the American Seed Trade Association would be very favorable to the project and do all they could to assist in carrying it out."

From G. W. Hilliard, President Cider and Cider Vinegar Makers' Association of the Northwest: "We are disposed to look upon the project favorably, and shall be pleased to do what we can to make the congress a success. We have intended to move in some way, to bring the subject of cider and vinegar-making more prominently before the people at the World's Fair."

From A. J. Rider, Secretary American Cranberry Growers' Association: "I see no objection whatever to the holding of the meeting of American Cranberry Growers' Association in connection with the proposed International Horticultural Congress. We are looking forward to the time in the cranberry business when a foreign market for cranberries will be of great advantage, and it would seem that in a congress of this kind some public notice at least would be attracted."

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THE LOVE of nature! Who has felt it? All have read of it, all know of it, many of us have sung of it. But how many of us feel it in the same manner as we feel the blood in our veins, or the thrill of life in our nerves? How many of us live in that sympathy with the out-of-doors which imbibes inspiration from the meadows and the trees? We suspect that much of this vaunted love of nature is little more than strenuous resolution. We work ourselves into a rapture while yet we sit in our study, or, perhaps, it is oftener an overpowering awe or admiration for grandness, as of a mountain or the ocean. But love is not conjured up nor experienced afar off. It is borne of a sweetness and restfulness and sympathy of temper which always finds interesting company. Nature is near at hand. Here is a bit of green sward, shorn and tidy, a mere patch inside stone walks. But it is a most coquettish bit. Every hour it is different. Now it is gloomy, overcast like a leaden sky. A moment later it smiles like a ripple of sunlight, and the birds sing and the bees hum. Again it is restful, like the droning of a sleepy breeze. This morning it awoke with a burst of laughter; yesterday it lay all the morning in tears and the spiders spun their crape over it. The bushes bent low to it, in sympathy. Later it was rollicking in a friskful breeze, and before noon it was in a flurry of scudding leaves.

⁂

THIS IS ALL sentiment, you say? Perhaps so. It matters not what you call it, so long as it eases the burdens of life and makes one happier. Who cares to live when he cannot be happy? Of course one cannot subsist on it. He must have bread. But the bread has the same sentiment in it. The beans and corn and tomatoes somehow behave in the same manner as that bit of green sward. But they are even more interesting, for each plant has an individuality, and they are all a part of the earth, and the winds and the sunshine and the dews and the rains. In the cool morning one loves to see them awakening; at noon they are glowing, and at evening they are quiet in the long shadows and the fading light. Somehow there seems to be no difference between birds and winds and plants and sunshine! The odors of the freshly turned soil and of the tomato vines are in some way a part of the same fabric. And the rustle of leaves and songs of birds and patter of rain are all from the same melody. And the clouds come near to one. Then the mind opens and is inspired, and the true love of nature and reverence for nature's God have an abiding place in our hearts.

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YES, THIS may be sentiment; but sweet sentiment means contentment and health. And if there were more of it on our farms and in the gardens there would be fewer tired farmers and gardeners. There seems to be a systematic effort among farmers to crush out this love of nature because it is thought to be unprofitable; and forthwith the spirit is crushed out of the boys and girls. It is the absurdest notion, that appreciation of nature can in any way conflict with the tilling of the soil! One does not need to stop his work in order to admire his environments. Nature speaks while he labors, and the love of it flows into his life as the sunshine falls into the flowers. It runs as a golden thread throughout the fabric of life. And there is no reason why it should make the potatoes less productive or should interfere with the price of strawberries. But the lack of it has made the farmer the least appreciative of men.

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ALL THIS fineness of feeling is not borne of knowledge. Facts intensify it and sometimes give it substance, but they do not give it birth. But education is the mother of it, whether the education is college-bred or home-spun. Education is culture of mind and heart; knowledge is mere filling. Yet the two are commonly confounded; in fact, they are thought to be one. So the farmer sends his son to college and expects him to learn only practical facts—and by practical he means dollars! Perchance the boy imbibes the germs of education, and then the farm may become distasteful because his feelings have outgrown its narrowness. But he still has a farm in his mind's eye—an ideal farm This is not a "fancy farm," but a plain, substantial, honest affair; but it has love in it. But it comes hard to love it and to love nature in these pinching times. Yet this is reason enough why we should love it the more. The present days are driving the dullest to the wall; they are refining our agriculture. So we must look to the children.

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WHO should have the flowers if not the children? Who can better appreciate their subtle charms? Upon whom can they have greater influence in the moulding of mind and character? Who so near in nature as the children to the flowers? None can love the flowers half so well as these, their human prototypes. Yet, the other day in New York, a boy with a great bunch of field daisies for sale was astounded beyond measure when a woman declined to purchase, with the remark that she lived where they grew in plenty. "Grew!" Then he forgot his desire to sell in his eagerness to know all about them and how they looked, and the fields of grass—all which the good lady told him as best she could, as the dirty little chap trotted along by her side on the pavement that was so different and far away from that dream of loveliness. If you want to study and touch human nature closely and easily, take a big bunch of flowers with you to town and give them away, one by one, to the children you meet on the street. Don't skip any, dirty or well-dressed. And don't be surprised if a rough looking man now and then asks for a flower when he sees you are giving them away. Don't puff yourself up with a feeling of good deeds done; you are only the medium of transit for the flowers sent by God to lighten dark and heavy lives. Be thankful for that, and leave the flowers to do their own work.

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GOOD FORTUNE sent wife and me to the seashore the last of April, so that we saw fair May in her robing of the wood and meadow in readiness for the summer time. Long, sharp hills of sandy soil flank the coast, and behind lie beautiful valleys. A varied flora covers the hills from crown to base, and everywhere are oak woods, park-like in their cleanliness, embellished with laurel, azalea, cornel, woodbine and honeysuckle; the meadows are covered with grasses, vines and flowers uncountable. Fences there are none, save here and there a bit to aid the landscape in their picturesque decay. Roads, cart tracks and foot-paths innumerable traverse field and wood in every direction, tempting to long walks amid sylvan delights in the long evenings after the day's work is done. Always loving nature, never before have we so appreciated her incomparable skill in gardening, or the countless lessons she may teach us in its every branch. Every natural park like this, near our large cities, should be set apart and *let alone*. This one seems doomed to early destruction to make so-called "summer resorts," where mammon can be worshipped, and the healing of the great waters turned into fashionable gayety and trifling.

⁂

NIGHT BEAUTIES are rarely appreciated—and rare they are, too! A drive in the early June freshness was continued an hour past sunset. While just beyond the shadow of Bartholdi's "Liberty," the improving (?) hand of the nature desecrator had not yet touched the quaint and ancient landmarks of a hilly seaside locality. As the twilight deepened, the shadows took on rich hues most restful to the eye, and a constant surprise. Then the flitting fireflies starred the woody nooks, giving a glint of life to the night landscape. And the odors! A succession of faint bouquets reached the olfactories, all the more delightful because new, and utterly distinct from the day scents. In some way they seemed to fit the sweetness of the night, and the sense of perfect harmony was most grateful to the mind and body, tired with the day in the great city's heat and hum. It was a revelation of unknown beauties, a rest to the soul, a preparation unequaled for the refreshing sleep within taste of the sea air.

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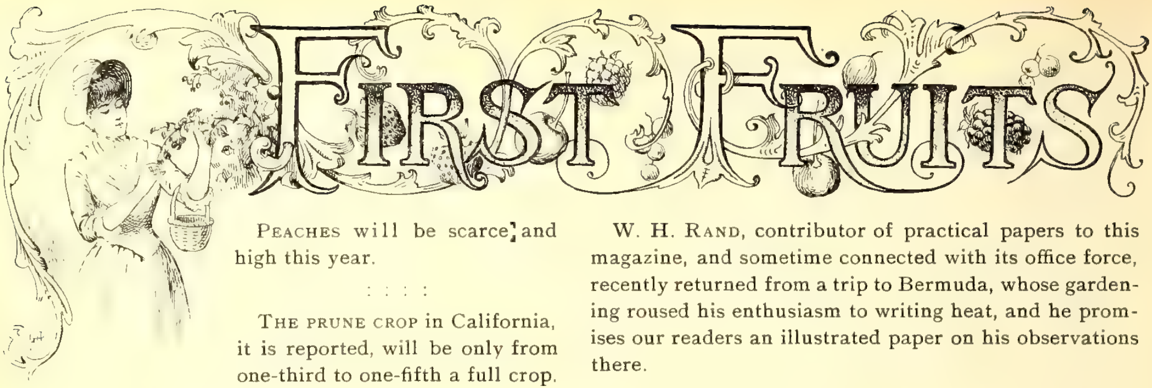
ENTERTAINMENT perennial is there for the possessor of the least knowledge of the flora of our grand country. With his eyes open he cannot be dull, he cannot feel ennui. Is his route on the iron highways? He can see his tree-friends in changing conditions as he skims over the states; he can notice the peculiarities of the weed-flora, giving here a white tinge to the scene, there a blue effect, anon flaunting scarlet or bright yellow. The relative sizes of the plants and trees, even, seem to form a natural boundary line between states sometimes!

Does he travel the dusty city streets? Even there his entertainment need not fail, for the art of the florist will give him comparisons with nature, and the gems of the tropics are ofttimes provided for his inspection. And on the quieter streets often a brave weed, clinging to the scanty soil between the bricks of the footway, will meet his eye, bringing him a pleasant memory of the broad fields where this same weed is not so welcome.

FIRST FRUITS



PEACHES will be scarce and high this year.

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THE PRUNE CROP in California, it is reported, will be only from one-third to one-fifth a full crop.

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THE March freeze has blasted all prospect of a fruit crop here.—J. L. NORMAND, *Marksville, Louisiana.*

: : : :

THE COLD SNAP of March damaged the fruit interests badly throughout the South, as well as in the North.

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THE SUMMER MEETING of Missouri State Horticultural Society was held at Poplar Bluff from June 3d to 5th.

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THE BUFFALO FLORISTS' CLUB announces a show next fall (date not given), and offers an extensive and varied premium list.

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OUR NEXT ISSUE will be largely devoted to cacti. It will be a novel and interesting number. The leader will be from the pen of Professor W. J. Beal, upon "Some Relations of Botany to Horticulture." Apple and orchid issues are in preparation.

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THE MARKET FLORISTS' ASSOCIATION is a new organization in New York, numbering some 500 members. The association aims to direct somewhat the marketing of flowers, and a permanent market in Union Square is desired. John Nicol, president; George Darsely, secretary.

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THOMAS MEEHAN, dear to every lover of gardens and plants, made his first contribution to horticultural literature and his first scientific endeavor just a half century ago. His life has been rich and versatile. Honors in civil affairs have been as great as those in his intenser labors.

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THE NEW YORK Italian street fruit-venders have organized into a society for mutual benefit and protection. It is said that there are over 4,000 of these street venders in New York City. The president of the new organization is Antonia Zucca, and the secretary is J. B. Roachi.

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THE Michigan State Horticultural Society will hold another exhibition with the Detroit exposition this year. Its display last year was exceptionally good. A large premium list for American tropical and sub-tropical fruits is offered this year. The exhibition occurs from Aug. 26 to Sept. 5.

W. H. RAND, contributor of practical papers to this magazine, and sometime connected with its office force, recently returned from a trip to Bermuda, whose gardening roused his enthusiasm to writing heat, and he promises our readers an illustrated paper on his observations there.

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THE NEW YORK FLORIST CLUB is preparing to give a great floral exhibition in November to fill the void left by the New York Horticultural Society. Friends of horticulture about the metropolis are invited to interest themselves in the project, and to subscribe to it. W. A. Manda, Short Hills, N. J., is chairman of the committee in charge.

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FRUIT IN GEORGIA.—Advices from Georgia, the peach center of the South, say that there will be about a fourth crop of peaches in the middle sections of the state, and even fewer in the southern parts. The Le Conte pear industry, which is very great in southern Georgia, will probably not reach over one-third its usual dimensions. For fifteen years the prospects have not been so poor.

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THE remaining special exhibitions of the Massachusetts Horticultural Society for the year are as follows: Annual exhibition of plants and flowers, August 19th to 22d; annual exhibition of fruits and vegetables, September 17th and 18th; exhibition of autumn fruits and vegetables, October 4th; Exhibition of winter fruits and vegetables, November 8th; Chrysanthemum Show, November 11th to 12th.

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CHARLES GIBB, whose death we recorded in the May issue (page 311), was on his way home, when he was taken with *la grippe* at Aden, on the Red Sea. He contracted pneumonia, and died at Cairo, Egypt, on the afternoon of March 8th. The remains were interred two days later in the British Protestant cemetery. His death removes one of our best and most devoted horticulturists. He had been to the orient to investigate the fruits, with a view to introducing valuable kinds.

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THE State Floral Society of California recently gave a spring exhibition, which was in every way a great success. Many fine plants were shown. Some of the things conspicuously mentioned were *Yucca Whipplei*, Rainbow and La France roses, and Bride gladiolus. There were 55 exhibitors, and nearly every class of cultivated flowers and ornamentals was represented. Collections of wild flowers were also conspicuous. Addresses were given by Professor E. J. Wickson and Emory E. Smith.

J. H. HALE, of Connecticut, is special agent of the 11th Census Bureau to investigate certain horticultural interests. General matters of fruit-growing are included in the general schedules. Mr. Hale's topics are five: the nursery business, semi-tropical fruits, seed-farms, truck farms, and the florists' business. The greatest efforts will probably be given to semi-tropical fruits and nursery statistics. Truck-farming is to receive first attention, however, and investigation in this direction will probably be completed this fall. As a preliminary labor, a directory is being made of all horticulturists in the nation who cultivate one-fourth acre or more. Mr. Hale is one of our most energetic nurserymen and pomologists, and the Census Bureau is to be congratulated that it has secured so good a man for work of such vast importance as this.

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THE third flower show of the Chicago Florist Club will be held next November. The following premiums are offered for chrysanthemums:

Class.	PLANTS.	1st.	2d.	3d.
1.	Best 6 white	$20 00	$12 00	$8 00
2.	" 6 yellow	20 00	12 00	8 00
3.	" 6 pink	20 00	12 00	8 00
4.	" 6 red	20 00	12 00	8 00
5.	" specimen white	6 00	4 00	2 00
6.	" " yellow	6 00	4 00	2 00
7.	" " pink	6 00	4 00	2 00
8.	" " bronze	6 00	4 00	2 00
9.	" " red	6 00	4 00	2 00
10.	" 2 standards, white	15 00	10 00	6 00
11.	" 2 " yellow	15 00	10 00	6 00
12.	" 2 " pink	15 00	10 00	6 00
13.	" 2 " any other color	15 00	10 00	6 00

(Standards must be grown with at least 30 inches clear stem.)

		1st.	2d.	3d.	4th.
14.	Best 50 plants grown to single stem in not over 6-inch pots	$50 00	$35 00	$20 00	$15 00
15.	Best 50 plants naturally grown in not larger than 8-inch pots	50 00	35 00	20 00	15 00

	CUT BLOOMS.	1st.	2d.	3d.
16.	Best general display of cut chrysanthemum blooms, both quality and quantity to be considered in making the award	$25 00	$15 00	$10 00
17.	Best collection cut sprays in vases, one of a kind	15 00	10 00	5 00
18.	Best 12 naturally grown sprays	5 00	3 00	2 00
19.	Best 100 blooms, two of a kind	20 00	10 00	5 00
20.	Best 12 blooms, one of a kind	5 00	4 00	3 00

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THE GRAY MEMORIAL BOTANICAL CHAPTER of the Agassiz Association was founded two and a half years ago, especially to aid those botanists who, remote from large libraries and herbaria, find their study often beset with difficulties which the more favored *habitues* of school and college do not encounter. The design of this association, as stated in the constitution, is "mutual assistance in the study of botany by means of correspondence and the exchange of specimens." Not the least of its benefits is the enthusiasm engendered, which isolated students do not always possess. Any lover of botany may become a member by making application to the president, stating briefly his progress in the study and means for pursuing it, and thereupon receiving the unanimous consent of the executive council, which includes the officers and two directors elected annually. The annual fee is fifty cents, but amendments are now pending to make it $1. Members are required to report quarterly, either recounting their progress during that time or describing some collecting trip. the flora of some region visited by them or a plant studied. At present there are 45 members in 22 states and territories. President, G. H. Hicks, Owosso, Michigan; secretary, E. L. Byington, Boulder, Colorado.

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THE SUMMER MEETING of the Ohio State Horticultural Society was held June 11th and 12th, at the Experiment Station, Columbus. The following premiums for strawberries, etc., were awarded:

	First.	Second.
Best two quarts Bubach	$2.00	$1.00
" " Jessie	"	"
" " Haverland	"	"
" " Crescent	"	"
" " Wilson	"	"
" " Cumberland	"	"
" " Warfield	"	"
" " Burt	"	"
" " Pearl	"	"
" " Eureka	"	"
" " Miami	"	"
" " Crawford	"	"
" " Sucker State	"	"
" " Sharpless	"	"
" " Cloud	"	"
" " Gandy	"	"

Any other variety, if worthy, $5, $3, $2, $1.
New variety never offered for sale, if worthy, $5, $3, $2, $1.
Display of roses, $5, $3, $2, $1.
Display of other flowers, $5, $3, $2, $1.
Display of plants, $5, $3, $2, $1.

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THE FAMILY FRUIT GARDEN.—At a recent meeting of the Columbus (O.) Horticultural Society, this subject was discussed. Mr. F. P. Dill, a successful orchardist, said of the apple: "Buy trees of a home nursery, selecting straight, sound trees. Plant carefully in well-prepared soil. Keep stock out of orchard. Fertilize and mulch bearing trees. Spray just after blossoms fall. I use about ten ounces Paris green to a barrel of water, adding a quart of soft soap to each barrel. This makes the poison stick better, and it is also less liable to burn the foliage. For Central Ohio would recommend the following varieties for home use: *Early*—Early Joe, Red Astrachan, Golden Sweet. *Fall*—Chenango Strawberry, Maiden's Blush. *Early Winter*—Pickaway Rambo, Northern Spy, Carpenter's Sweet, Grimes' Golden, Baldwin, Peck's Pleasant. *Late Winter*—Ben Davis, Stark, Fink." Mr. Bonebrake said that crowding the roots of a tree in a small hole was not planting. Prepare ground carefully. If tree is bent, put top to west, and if straight lean to west, so that wind will not bend it too much to east. Trim top to correspond to amount of roots. Three things are to be observed in pruning: (1) To add to symmetry of tree; (2) to remove limbs which cross each other and rub; (3) not to trim bare, but simply to remove superfluous wood.

In discussing the place of the pear in the family fruit garden, Mr. W. J. Green said that during recent years this fruit has been doing much better than formerly, and that it could be grown with comparative safety now. The trees should be planted in much the same soil as apples, but must not be fertilized when young, as it stimulates too rapid growth and induces blight. In general it is better to plant standards than dwarfs. There are only two varieties that are safe to plant as dwarfs—Clapp and Angouleme. Of the varieties to be grown as standards, the following are good for home use: Summer Doyenne, a small but very early variety; Osband's Summer, superior in appearance to first named, but poorer in quality; Bartlett; Seckel; Clapp's Favorite; Angouleme; Lawrence and Anjou, the last two being good, reliable winter pears. Keiffer is good for canning. Vicar should not be planted. A good pear orchard can be depended upon for a crop every year.

Professor W. R. Lazenby discussed the strawberry, in an excellent paper on "Don'ts for Beginners in Strawberry Culture." Among the points noted are the following: Don't commence strawberry culture on a large scale. Don't plant largely of untried varieties. Don't try to see how large a strawberry bed you can have, but rather resolve to produce the greatest amount of fruit from the smallest possible area. Don't be content to raise any but best quality of fruit for the family. Don't plant strawberries in the shade of large trees. They resent shade, and the roots of the trees rob the plants of moisture when it is most needed. Don't use highly nitrogenous manures, or you may have a rank growth of foliage at the expense of fine fruit. Don't plant too deep or the crown will rot, nor too shallow or the roots will be too dry. Plant just the right depth, and don't fail to press the earth firmly about the roots. Don't fail to start the cultivator and hoe about as soon as the planting is over, and persist in their use, always keeping a mulch of loose soil about the plants. Don't keep an old strawberry bed after it is infected with insect enemies. Plow or spade it up. Don't fail to select varieties for home use from the following list: Bubach, Haverland, Sharpless, Jersey Queen, Cumberland, Crescent and Warfield. Don't plant Belmont, Bomba or Mammoth. —SECRETARY.

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THE SPRING IN CALIFORNIA.—Our floods seem to be over. It has been a long, dreary, wet spell, the longest ever known in the state. Now that we have had a chance to look over the ruins during the ten bright days past, we find that we are not seriously injured. Some rolling fields of light soil are badly washed and guttered. Some bridges are gone. There are many miles of damaged roads, and little remains of small grains planted, except in the dry interior valleys, where the crop promises to be immense. In this, Sonoma county, scarcely any damage was done, except in the roads, the loss of a few small bridges and the injury of grain crop. This last will prove no great loss, for the land can yet be planted in more profitable crops, though such as cost more labor. The average Californian has no love for a great exercise of his own labor. He prefers to earn his bread by the sweat of his hired man's brow.

The prospects for fruits of all kinds, it is generally conceded, were never better. Ten days of bright, warm sun has painted our hills, valleys and mountains with Flora's brush, with every rainbow tint. The air is laden with spicy fragrance. The almond put on her pink colors a month ago, and still looks fresh and sweet. The apricot followed suit a little later, blushing still more brightly at being a little late. The peach is showing tiny globes of crimson, with no fear of biting frosts. The cherries and plums are donning their dresses of white. The apple is in no hurry. This is truly the land of fruits and flowers, especially flowers. There has not been a day this winter but that one could form a bouquet from a dozen species of flowers plucked from the open-air gardens of this little city. It seems strange to reach up and pluck from a rose-tree full-blown and perfect roses or buds, when the soft, wet soil is frozen beneath our feet nearly firm enough to bear one; yet this is one of the peculiarities of this strange climate, proving that it is not the freezing that kills, but rather the sudden thawing out in dry air. These very wet winters seem to come periodically, once in ten or twelve years, and are looked upon as of great benefit to the farmer, especially so in the dry interior, in washing out and flooding away the alkali, and they are generally followed by several extra fine crops. —D. B. WIER, *Petaluma, California, March 15th.*

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THE AMERICAN ASSOCIATION OF NURSERYMEN convened at the Park Avenue Hotel, New York City, on Wednesday morning, the 4th of June. President Sweet's address detailed the migration of the center of the nursery trade from Western New York, where it existed thirty yearo ago, to Ohio or even farther west. He also mentioned the fact that prices of nursery stock are steadily declining. The report of the treasurer showed about $1,000 in the treasury.

H. E. VanDeman, United States Pomologist, spoke at length of new fruits. He emphasized the importance of giving greater attention to native fruits—that is, fruits of native wild plants. The United States is richer in promising wild fruits than any other country in the temperate zones. There are some 20 uncultivated species of indigenous grapes, for instance, some of which are more promising than *Vitis Labrusca* was in the wild state.

The varieties of native plums are promising, especially the offspring of *Prunus Americana* in the northwest. A number of varieties were alluded to.

Of Japanese plums, Botan is very promising. It appears to be hardy even in Connecticut. It is much like Kelsey, except that the fruit is less pointed and only about half so large. Ogon, often erroneously written Ogan, is equally hardy. The fruit is nearly round, yellow, the size of the Wild Goose. Burbank is one of the most promising Japanese plums. It has not yet fruited outside of California, but it gives promise of being hardy in the east. It is not much larger than Wild Goose; purplish and remarkably handsome, very rich, being equally as good as any green gage. The Satsuma or Blood plum will probably prove hardy in the north also. It is large, about two inches in diameter, with a very small stone; good in quality, medium in season, and blood red inside. The Kelsey is a very large fruit, often measuring three inches in diameter. The color is purplish, over a tint of yellowish green. The true Kelsey will not mature north of Tennessee or North Carolina. The variety as sent out is much mixed. The Japanese plum foliage is not attacked by the fungus which causes the foliage of common varieties to drop prematurely.

Prunus Simoni gives little promise except as a possible parent of improved sorts. The fruit is usually poor, medium in size.

The Clyman is one of the most promising of all new plums, from the fact that it ripens with the Wild Goose, fully six weeks ahead of common plums. It is true *Prunus domestica*. It is Californian in origin, but gives promise in the east.

Of grapes, the Lyon was much praised by the speaker. It is a red grape, larger than Delaware, and a better bunch, with quality fully as good. It is of Michigan origin, and is named for the venerable T. T. Lyon. The Ohio Culinary grape is a very foxy and poor sort. The Colerain grape was well spoken of by several. It is a white grape, ripening between Martha and Lady. The skin is somewhat tender, but it will ship as well as Worden. The Green Mountain is the earliest white grape, and is fair in quality. Woodruff Red bids fair to become a good market grape, but for amateur use it is inferior.

Krull is one of the most promising new pears. It is, in Mr. VanDeman's opinion, the best winter pear yet produced. It resembles the Lawrence, is fully as late as Vicar and as good as Nelis. It originated in Missouri, and is not yet disseminated. Idaho is a second and improved edition of Duchess. Philopena, from Indiana, is very promising; the original tree is fifty years old, and is a seedling reared by Ruben Ragan.

Among apples, the Garfield, from Illinois, was praised. It is very hardy; fruit nearly as large as Ben Davis, brilliant crimson striped on a yellow ground, slightly conical, good in quality. Leighton, of Illinois, is much like Garfield; a yellowish fruit—and a very hardy sort. Shirk is a new Indiana fall sweet apple of great promise. It is the season of Bailey Sweet, and the tree is a nice grower. Bullman is an Illinois apple which is the same as Red Canada. Ivanhoe is a late winter apple, very poor in quality; much like Mann in looks, but not so flat. Peffer, from Wisconsin, is a seedling of Pewaukee, but a better apple and fully as hardy. The Windsor apple, also a Wisconsin seedling, is a medium red, handsome; flesh very white, poor in quality, hardy. Colton is an Ohio apple, one of the best very early summer sorts. It is very productive; a good cooking kind. Harry Kaump, from Wisconsin, is a late fall apple of promise, medium in size, greenish yellow. Foundling, an old New England winter apple, was recommended for general culture.

Of strawberries the Pearl was particularly endorsed.

Nut culture is assuming prominence, particularly chestnut culture. Wherever wild chestnuts grow, the culture of the improved nut can be successfully prosecuted. The Dupont or Ridgely is a good chestnut, but the Paragon is probably better. Native chestnuts are always better in quality than foreign sorts. The pecan has been wonderfully improved of late, and some sorts are now grown from which the bitter inner rind is removed.

The Crandall currant was endorsed. It is variable, and this variableness was found to be due, according to a statement made in the meeting, to the fact that several original plants, all seedlings, were distributed as the same.

Among oranges, the Hart's Late is one of the most valuable, chiefly because it is very late. It was introduced from England many years ago by S. B. Parsons. It is also known as Excelsior (the oldest name), Brown, and in California, as Valencia Late. Bessie, a Florida seedling, is equally as late as the last and as good. Jaffa and Majorca are recent introductions of great value. The Satsuma is the hardiest of all edible fruited oranges, but it cannot be commercially grown even as far north as Georgia.

The pomelo is a valuable citrus fruit of which named sorts have not been grown in this country. Some named sorts are now introduced, of which Aurantium is one of the best, This fruit is often erroneously called grape-fruit and shaddock.

Of lemons, the Villafranche is good. It is a sweet rinded sort. Eureka, from California, is one of the very best.

G. E. Meissner argued that stock can be dug too early in the fall. A resolution was offered and after much discussion adopted, urging that the Association use its influence to discourage the practice of early sale and digging of nursery stock. The wood of trees should be allowed to mature naturally. It appeared to be the sense of the meeting that early fall digging of trees was almost entirely the fault of customers, many of whom persist in ordering too early.

[The remaining report will appear in the next issue.]

Professor Bailey offered a resolution, which was adopted, requesting the Secretary of Agriculture to turn over to the Division of Pomology for the purchase and distribution of new fruits, at least $5,000 of the $100,000 appropriated by Congress for the distribution of seeds and plants.

James D. Raynolds, president of the Chicago Florists' Club, was endorsed by the Association for the position of Commissioner of Horticulture of the World's Fair.

A committee on registration of plants was appointed, consisting of L. H. Bailey, New York, N. H. Albaugh, Ohio, and S. B. Parsons, New York.

S. M. Emery was constituted a standing committee on express rates.

The officers of the ensuing year, are S. M. Emery, Minnesota, president; J. Van Lindley, N. Carolina, first vice president; C. A. Green, New York, secretary; A. R. Whitney, Illinois, treasurer; Irving Rouse, New York, W. J. Peters, Ohio, and Franklin Davis, Maryland, executive committee. The next meeting is to be held at St. Paul or Minneapolis.

FOREIGN NOTES.

The Northern Tasmanian Horticultural Society will be represented at the National Chrysanthemum Society's Centenary Festival at London in November next, by Mrs. W. J. Thromer.

⁂

Angle-Worms in Flower-Pots.—Take one part of vinegar to three parts of water. Use this in watering the plants. If the first application does not destroy the worms, it may be repeated with safety two or three times.—*Garten-und Blumenzeitung.*

⁂

Arthur Malet Begonia.—The leaves of this variety are broadly and obliquely cordate, deep purple, and covered with little elevations, upon which is noted a short bristly hair, as in the sub-shrubby *B. incarnata*, of which it is a form.—*The Gardening World.*

⁂

Myrica Rubra.—This is a new fruiting shrub from Japan, and deserves to be grown in our cool houses for its fine evergreen foliage as well as for its fruit. The latter is dark red and very agreeable to the taste. It is about one inch long and three-fourths inch in diameter.—*Garten-und Blumenzeitung.*

⁂

Her Majesty Pink.—A quantity of cut-flowers of this variety was shown at the Royal Aquarium on the 21st of May, when a first-class certificate was awarded it. The flowers are large, double, pure white, and crenate at the apical margins of the petals.—*The Gardening World.*

⁂

Condition of the Fruit Crop in France.—In spite of the severe freezes which occured in France just as all vegetation was starting, the prospect of a heavy fruit crop is very promising. No fruit was seriously injured except apricots, which in some localities will be a total loss.—*Revue Horticole.*

⁂

Cabbage, Chou de Noel.—This is known in the west, of France as *Chou ardoisè d' hiver*. It has a short stalk, thick and rounded leaves, and a round, very firm head. Its color is very dark glaucous green, really slate-colored. It resists frost perfectly, is late, and arrives in the market after all the large fall cabbages have been exhausted.—*Revue Horticole.*

⁂

Export of Narcissus from the Island of Scilly.—On Tuesday, the 1st of April, 2,500 packages of flowers were sent to the various markets in England and Scotland ; in this consignment were included upwards of 100,000 bunches of *N. ornatus ;* 30,000 alone were sent from the Abby Gardens, Narcissus Farm, Tresco.—*The Gardeners' Chronicle.*

⁂

Horticultural Instruction in England.—A bill has recently been introduced in the House of Commons, providing for instruction in agriculture and horticulture in the elementary schools. These schools are to be open to inspection by committees. Institutions devoted entirely to agriculture and horticulture, and having special courses of study, will receive graduates from the elementary schools.—*Revue Horticole.*

⁂

Beet, Reine des Noires.—It is long since we have been able to make known a variety of beet uniting, in so high a degree, the useful and the agreeable. This beet possesses an ample, very ornamental foliage, of a remarkable intensity of coloring, with a deep rust color predominating. The root is pyriform, medium large, very regular, and almost buried. The color of the flesh is dark red, approaching black.—*Revue Horticole.*

⁂

Rose Oscar II of Sweden.—This is another remarkable rose originated by Messrs. Soupert & Notting, of Luxemburg. It is said to be the result of a cross between the roses Dupuy Jamaine and Madame Victor Verdier, and possesses really superior merits. The flower, which is very large and perfect, is bright carmine, richly variegated with deep vermilion. The bush is very vigorous and prolific.—*Revue Horticole.*

⁂

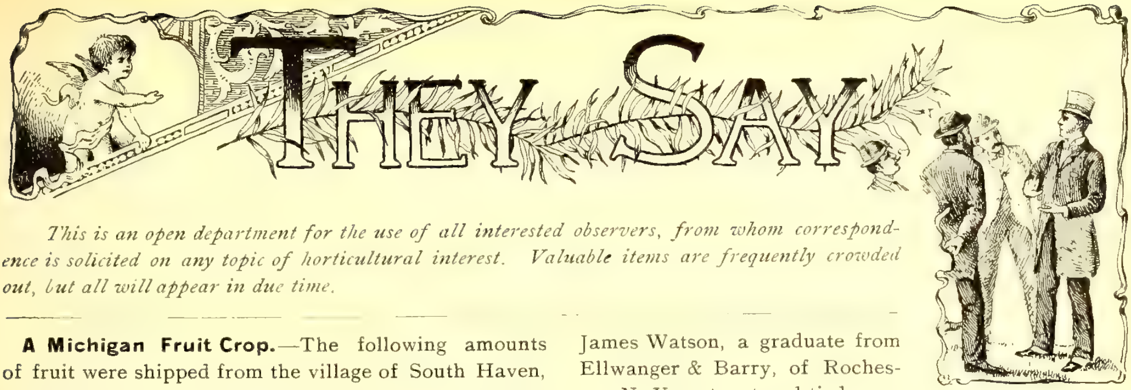
The Destruction of Caterpillars.—The Prefect of Meurthe-et-Muselle has given out a notice, based on the law of the 24th of December, 1888, requiring all proprietors, farmers, tenants, corporations, and any others who have charge of lands, to clear all the trees, hedges, thickets, etc., of caterpillars twice every year. The first clearing is to take place during February, and the second during May —*Revue Horticole.*

⁂

The Most Vigorous Tea Roses.—Experiments carried on by 53 amateurs, and as many professional growers of roses, show that the following roses, in the order named, are the most vigorous : 1, Mad. Lambard ; 2, Marie Van Houtte ; 3, Anna Olivier ; 4, Souvenir d'un Ami ; 5, Gloire de Dijon ; 6, Rubens ; 7, Francisca Kruger Hon. Edith Gifford, Jean Ducher ; 8, Catherine Mermet, Mad. Willermoz, Mad. Bravy.—*Revue de l' Horticulture Belge.*

⁂

A New Bamboo.—One of the most noble and distinct of all the bamboos, so far as foliage is concerned, is the *Bambusa palmata*. This plant has finer leaves and is more erect in habit than any other variety. In one specimen the stems were five feet in height, with from five to seven leaves at their apices only ; the largest of these leaves were twelve to thirteen inches in length, by four to five inches in breadth at their widest part. Above the leaves are of a rich yellowish-green tint, finely veined, and below they are of a soft blue or glaucous hue. The plant is said to be hardy, and is well worth pot or tub culture in the greenhouse or conservatory.—*The Gardeners' Chronicle.*



THEY SAY

This is an open department for the use of all interested observers, from whom correspondence is solicited on any topic of horticultural interest. Valuable items are frequently crowded out, but all will appear in due time.

A Michigan Fruit Crop.—The following amounts of fruit were shipped from the village of South Haven, Michigan, in the "fruit belt," last year:

There were 127,393 baskets of fruit, of which about 110,000 baskets were peaches. There were 34,951 crates of fruit, and 21,371 barrels of apples. An evaporator used about 45,000 bushels of apples, and manufactured some 3,000 barrels of cider and between 40,000 and 50,000 pounds of evaporated apples.

Citrus trifoliata.—The illustration on page 271 of the May AMERICAN GARDEN represents *Citrus trifoliata*, rather than the Satsuma, as printed.

The Lombard Plum is in disfavor in interior places, because it does not "stand up" well in shipment.

Burying Lemons.—The *Rural Californian* relates the following instance of keeping lemons in sand: "The lemons had been picked by Mr. Ayers in January, packed in boxes, and buried in the sand, under cover, so as to keep off rains. After lying three months, they were dug up, and found to be as fine as the best imported lemon. We believe that as good lemons can be grown in southern California as can be imported from Europe, and we only need to exercise a little care in handling the fruit, to make our lemons bring as good a price on the market as foreign lemons do."

Russian Apricots.—Some of the new Russian apricots give great promise. We should like to hear from our readers who have fruited them, at the close of the apricot season.

Single-Pole Grape Training.—The objection that might be raised to the single pole system, and which would tend to confine it to amateur culture, is the fact that much labor is involved in bringing each vine into position, bending the canes, tying, pinching the suckers, etc. But so doing, and the systematic attention to these minor details, is what brings the sure crop every year. The vineyards on the Rhine are enormous, and are all laid out on the single pole plan. That being the great crop, it dare not fail, and every bit of labor pays. Of course the American system of putting in the plants and waiting for the fruit is by far the easier; but it is an off year when a crop is realized. I have had but two poor crops in seventeen years upon vines trained to single poles.—A. F. HOFER, *Iowa.*

Rapid Budding.—The *Pacific Rural Press* prints the following from an eye witness: "In September, 1854, at the old Soscol nurseries and orchards, Napa county, James Watson, a graduate from Ellwanger & Barry, of Rochester, N. Y., cut, set and tied 1,500 apple buds in ten hours, and but three per cent. of them missed. That was when the nursery business in California was in its infancy and horticulture in its swaddling clothes."

The Satsuma Orange.—I have fruited the Satsuma seven years. I have a hundred times written men who were planting or budding groves, "You do not want more than a half dozen trees of Satsuma." They are like so many Japanese varieties, in this climate, so liable to attacks of fungi and insects. They are more hardy than the Mandarins, but not enough so to be grown far north. On the morning of the 17th of March last, at a temperature of 22°, lasting not over thirty minutes before it was back to 30°, every fruit set of Satsuma was killed, and the new growth all shortened back.

The Mandarins were not as forward as Satsuma and were little injured, in this freeze. I have seen some Mandarins which, by any standard of judging, would out-rank any Satsuma I have ever seen at our horticultural exhibits by ten or twelve points. I can take back very little of what I wrote in the *Florida Dispatch* three years since:

"The quality of the Satsuma is superior to many others. It is hardly a tree. It is a small bush at most, diminutive indeed. I have never seen one capable of holding more than half a box. True, I have no buds older than six years. It is the most hardy orange tree I have seen; fruit has loose rind, is highly colored and very few seeds. Plant six by twelve feet."—LYMAN PHELPS, *Florida.*

The Adaptability of Fruits.—Perhaps there is no horticultural subject which has called forth so many conflicting opinions, as the adaptability of fruits to a certain location, for one who succeeds at one place, may not at another only a few miles distant, on apparently the same kind of soil. This is particularly true with many of our small fruits, and it accounts for the conflicting reports respecting them. This fact has influenced the establishment of our experimental stations It is useless to attempt to come to a conclusion about varieties, unless we know exactly the conditions under which each variety is grown. This can be done by experiment stations or individual enterprise, by collecting the different varieties and growing them under similar conditions, and keeping a record of the weather, particularly when in bloom. A few days difference in the time of blooming may make a success or failure. While experiment stations should make these tests, yet they are from six to twenty years behind our most experienced progressive fruit growers, as it requires that time to fully test the value of the different kinds of fruits in any locality.

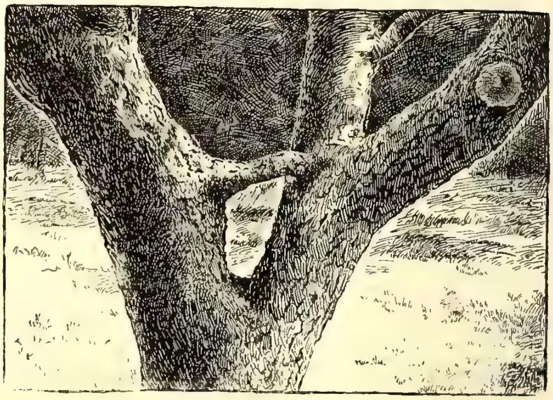
The lack of adaptability of fruits is no doubt one of the principal causes of disappointments in fruit-growing, for few persons undertake the business with any fixed idea of what they want, and where to plant what they have. One reason for this is the fact that we have so many varieties which appear to be good, that we cannot make a selection with any degree of certainty. An error once made can seldom be corrected, for few persons live long enough to plant out the second orchard on the same place, and few if any would do so, who failed in the first. As the apple is our great commercial fruit, exceeding in value all others combined, it is the more important that we make no mistake with it; and there is no just reason why we should. Some fruits depend directly upon climate. The peach cannot be grown with success where the temperature falls 17 degrees below zero, and some of our grapes, blackberries and raspberries will not endure that degree of cold. And none of these fruits can be grown anywhere where the temperature changes suddenly 60 degrees in 24 hours, without protection, even if the temperature does not fall below zero. But it is not so with the apple, for all varieties will endure 17 degrees below zero without injury, as well as the sudden changes, and it is not very particular as to soil.

We may also fail for the want of the right varieties of apples. Who could succeed with the Milam in competition with the Jonathan? Yet the one is as productive as the other, and equally as well adapted to the same soil and location. This is the case with a very large number of varieties, as the Hall, Holly, Mangum, Kittageekee, Watwood, Hutchison, Louck's Cluster, Crain's Spice, Goodyear, Abram, Flat Romain, Clark Pearmain, Rock, Mattamuskeet, May, Fink, Shockly, Yates, Great Keeper, Lansingburg, Yahoola, Petrez Favorite, Wasp, Spafford Russet, Fett, Ross Nonpariel, Enos Winter, Faust, Jermanite, Press Ewing, Maxey, Virginia Quaker, Williams of Virginia, Broad River, Sweet Russet, Hampton Russet, Tender Skin, Thurond, Ingram, Clark of Kentucky, Gipson of Kentucky, Wright's Jenet—nearly all of southern origin. These can be grown here and may be considered adapted to any climate where the mean monthly temperature is the same as here, but they are of no market value compared with others. This is the case here with nearly all southern summer varieties, as well as nearly all of the northern winter apples.—J. STAYMAN, *Kansas*.

Controlling the Markets.—Organization by horticulturists is often able to effect permanent good in the obtaining of new markets, and the partial control or education of old ones. A marked instance of this just comes to our notice from Benton Harbor, in the great fruit region of southwestern Michigan. Heretofore the shippers have depended largely upon the Chicago market. Now the Berrien county Horticultural Society has secured from the American and United States express companies, a special rate list to 390 cities and towns available for fruit shipments from Benton Harbor, on which reductions of twenty-five to forty per cent. from regular rates are given. It is expected that this will enable growers to send their fruit in all directions direct to consumers, and thus realize much of the advantage that has usually accrued to the "middle men."

It is not believed that this opening up of new markets direct, will make any material difference in the aggregate of shipments by boat across the lake to Chicago. The fruit crop is growing larger year by year, and under the stimulus of more and better markets, and better prices for the fruit, will continue to grow.

Braced Crotches.—The accompanying illustration is from a photograph, and shows crotches of an apple tree braced by a living branch. This brace is composed of two limbs twisted together while small. The limbs grow into a solid branch in a few years.



A BRACED CROTCH.

Fruits from the Department of Agriculture.—Much as I dislike and have written against the practice of scattering over the country from the Agricultural Department common garden seeds, that are to be had at any store, I must come to the defense of the department in the matter of plants, cuttings, etc. They do distribute to stations and nurserymen many valuable plants and cuttings. I have received from them the present season a number of rare sorts of foreign grapes to be used for hybridizing purposes under glass, and thirty varieties of figs imported from the best fig growing parts of the world. *Citrus trifoliata* was sent out by the department, and many of the best sorts of oranges now grown in Florida and California owe their introduction to Mr. Saunders' efforts, including the Navel orange, which he brought from Bahia. In regard to *Citrus trifoliata*, I would like to state that trees planted by me in northern Maryland in 1880 went through in the winter of 1880-81, (not '86 as *Orchard and Garden* has it), a temperature of 18° below zero unhurt, and are now in full bearing. We are now testing the Satsuma, and one of our little trees only a foot high made flowers this spring. Satsuma is an evergreen and we do not feel so sure about it as trifoliata, but hope it may be hardy here.—W. F. MASSEY, *N. C. Experiment Station*.

Six Ways of Setting Strawberry Plants.—

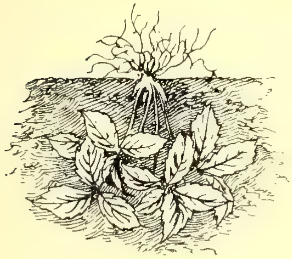


FIG. 1. "A HEADER."

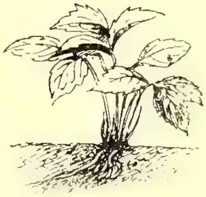


FIG. 4. TIGHT SHOES.

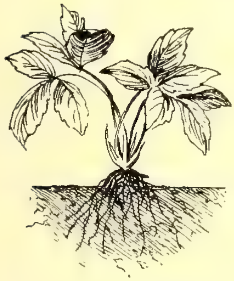


FIG. 2. TOO NEAR THE SUN.

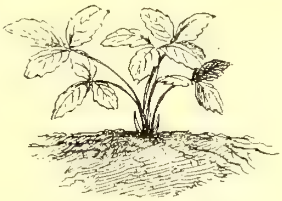


FIG. 5. TOO SHALLOW.

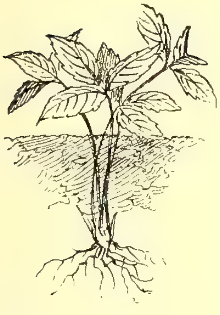


FIG. 3. TOO NEAR CHINA.

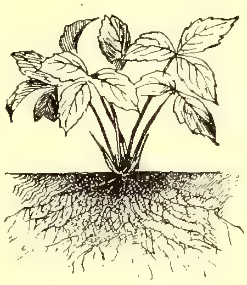


FIG. 6. GOOD!

Peach Culture in Minnesota.—It may be of interest to many of your readers to learn how my peach orchard came through the last winter—the fourth winter under cover. Small one year old trees when set are now very large of their age, though laid down every winter. The prospect of a large crop per tree is good, the trees are in fine condition and full of bloom almost open, and if late frost does not interfere will load to their utmost capacity to bear. The fact is demonstrated that peach culture is a success in Minnesota. But the question is asked, will it pay? The same question was asked us when we first began grape culture here by laying down and covering. It paid, not only in dollars and cents, but in the added home luxuries.

Just what my process of peach culture is has been published in various journals, but as this may reach many who have not seen the account I will here repeat. I prefer small one year old trees with whole roots. Dig the hole the proper size and depth, a little deeper than for ordinary planting; then make a cone of solid earth across the middle of the hole, in line with the row, or in the direction the tree is to be laid down. Then divide the roots into two equal parts or as near as can be, each division as compact as possible, and saddle them over the cone of dirt; then fill up and pack the dirt as in other planting. In the fall when you wish to lay them down, dig on the side to which you want the tree to turn and it will lop over as if on a hinge. Place a little hay or leaves under to keep the small branches off the naked ground, fill in the dirt around the roots, over which put leaves or some other litter, and over that litter and the entire tree put about six inches of hay or its equivalent in straw or corn stalks. And in the spring remove the covering and the dirt, lift the tree and replace the dirt around the roots.

To avoid mice, I use strychnine bait under cover of the tree. To keep the bait dry I use two pieces of boards, one on top of the other; on that I put about a spoonful of dry corn meal, and over it dust the strychnine made fine as dust, and over all put two boards nailed edges together to form a roof, and the trees are safe.—PETER M. GIDEON, *Excelsior, Minn.*

Vegetable Gardening in Florida.—In south Florida, a vegetable plot can be prepared and planted any month in the year, and by successive plantings, the table can be continually supplied with healthful and toothsome food without missing a day. Usually however, the garden is prepared here in Octobor, the work being about the same as that done in April and May in the northern states. The kinds of vegetables planted are the same, with few exceptions, and some additions that thrive in these semi-tropical latitudes, but could not be grown at the north outside of a hot-house. Gardens, however, are begun here every month from September to April, the chances of success for the latter month with vegetables generally being about the same as or less than June planting at the north. The bulk of a few field crops, such as cow-peas and sweet potatoes, are not planted until June or July, while rice is planted in May. In fact, nearly every month is considered more especially favorable for the planting of some particular product, the time depending to a great degree upon the time of the season's rains, though many will yield a fair amount at whatever season they may be planted if the soil is sufficiently moist for prompt germination. This gives the maker of a south Florida garden a great advantage as regards variety of crops. at all seasons of the year. It also enables him to plant again, should he fail to secure a good stand at the first planting.—SHERMAN ADAMS, *Orange County, Florida.*

Un-dug Potatoes in California.—The protracted rains of last fall prevented the digging of potatoes in many parts of California, and this spring the fields are coming up strongly with a self-planted crop. The farmers are caring for these fields in the usual manner. California promises to compete sharply in a few years with the early potato crop of the Bermudas and the South.

Asparagus Soup.—When asparagus is a little old to use as a vegetable it will make good soup. Boil it gently for three-quarters of an hour, cut off any tender tops there may be, and add to a quart of boiling milk. Rub together one tablespoonful of butter and two, even full, of corn starch or flour; add carefully to the boiling milk; add the tops and salt and pepper to taste.

Jerusalem Artichoke.—I have never studied the artichoke as a botanist, but if I were called upon to name it as a flowering plant, I should call it the tuberous-rooted perennial sun-flower; for its blossom is a small sun-flower.

As an article for table use, the artichoke is excellent. It not only makes a good salad, but is a staple dish when cooked and dressed like beets or peas. But as a pickle, it is delicious. One thing in its favor is that in the spring of the year, when potatoes are old and unfit for use, the artichoke is in its prime. It is in the ground all winter, and can be dug from the time the frost is out of the ground until early vegetables come again. There is a peculiar spiciness about it which is delicious, to many, and when cooking, the odor is pleasant. The tuber is white, solid and crisp. It cooks as soon or even sooner than a potato, it should be cooked in enough cold water to cover, and allowed to boil till tender, being careful not to get too soft. Then turn into a colander to drain and cool; when cool the skin is easily pulled off, and it is ready to season with salt and butter or cream, or to be made into a pickle, by being covered with vinegar.

The artichoke is a sure crop, and once planted, it needs no replanting from year to year. It takes care of itself, and needs no cellar, unless you gather in a supply for use through the winter. There is many an unsightly spot in back yards, even in neat villages, which if planted with artichokes, would make a cooling shade and yield a crop of vegetables for the family, and blossom all summer.—H. V. A., *Vineland, New Jersey.*

Potato Scab.—It is now generally admitted that the scabs and cracks on potatoes are caused by some injury, mechanical or otherwise, to the tuber. They first appear at the so-called lenticels, which are small pimples on the surface of the potatoes and serve as breathing spots. If the cells at this point are injured, an attempt is made to repair the injury, and layers of corky cells are formed which produce the so-called *scab*. These spots often spread, and running together form large blotches. The cause of the injury to the lenticels has not been ascertained. It has frequently been attributed to insects and fungi. Wire worms are sometimes found feeding on scabby potatoes, and although we have no evidence that they attack perfect tubers, they may do so, and in that case, scab would undoubtedly be produced. Scab, however, is very prevalent in fields where wire worms cannot be found, and it must there be attributed to some other cause. It is not believed that fungi are in any way the cause of scab, although they are sometimes found on potatoes where scab has already developed.

Among the other causes that have been mentioned are continued drought, excessive moisture, or a drought followed by heavy rains, and the presence of various corrosive substances in the soil, as lime, iron or ammonia. From our present knowledge of the scab, any of these, or more likely a combination of two or more, may furnish the requisite conditions for its development. The use of scabby potatoes as seed was at one time said to lead to the development of scab in the resulting crop, but from various experiments this is not considered probable. It has been claimed that the use of sulphur would cause a great decrease in the amount of scab, but our experiments have not shown this to be the case,—L. R. Taft, *Michigan Experiment Station.*

Remedies for the Striped Cucumber Beetle.—I suppose all these hoops and covers are nice things to play with (May, 279). I have been growing all sorts of squashes, melons, cucumbers, etc., for the past thirty odd years, and never found any use for such contrivances. The bugs attack my melons and squashes, I suppose, as badly as any one's else. When they are all gathered to the fruit I dust them over with a handful of fine bone-meal and bid them good-bye. If I have lost a hill of cucurbitaceæ by the beetles I have never found it out. So I get "tired" when I see a fellow fixing snow-bird traps in a melon patch to head off beetles!—W. F. Massey, *N. C. Experiment Station.*

Tomatoes.—I would like much to get seed of those tomatoes which ripened for Mr. Hallock in 115 days. The tomato has always been a hobby of mine, and I generally succeed in beating my neighbors (the prospect now is that I shall pick my first ripe fruit about May 20th), but I have never yet found a tomato which will give me ripe fruit in 115 days, or 120 days either, when any considerable portion of its growth comes in early spring or winter under glass. I shall sow between 40 and 50 varieties of tomatoes for exhibition at our State Fair, Oct. 14, and will only expect to get them in good condition at that time by sowing the seed last of May. I shall be surprised if any of them grown entirely in hot weather show ripe fruit before the last of September. For early tomatoes, I have flattered myself that I was as skillful as anyone in forwarding the plants. I formerly got tomatoes in northern Maryland the last week in June, two or three weeks ahead of most of my neighbors, but I had to start very early to do it. I have now under trial 40 varieties started early under glass, and thrice transplanted, but none of them will give fruit in 115 days. Perhaps Mr. Hallock meant 115 days from setting the plants.—W. F. Massey, *N. C. Experiment Station.*

Casaripe or Kassareep.—Who knows anything about this West Indian product? A writer in the *Saturday Review* says: "In the great old times of the West Indies, men boasted the age of their pepper-pot as warmly as the age of their madeira; in a rough way they calculated the increase of value at five dollars a year, and trade was brisk at the price. The basis of this perennial dish is casaripe. It may be hoped that the Berlin exhibition will be the means of introducing kassareep to European commerce. It is seldom to be found in London—indeed only so far as we can learn, at a shop in Leicester Square."

If the problem of nutrition is how to get the greatest enjoyment consistent with sound health and length of days out of the bill of fare that nature has provided, and if the gratification of taste is as laudable within the proper limits as any of the admitted ends and aims of existence, this casaripe is worth looking after, and the pepper-pot competition might prove as lively, and almost as profitable as the crazy-quilt mania.—Emelie Harris.

[The pepper-pot or mandram is a West Indian appetizer composed of several ingredients, of which red pepper and ochra are the chief.—Ed.]

A Practical Hint to Onion Growers.—Manure the land well with good, short, rotten manure; dig the ground to a good depth, mixing the manure well with the soil. Rake the bed fine and run a light roller over it. Draw out the drills one foot apart and half an inch deep. Put a short stake into the ground at each end of the row, and one in the middle; sow the seeds in the drills; cover them tightly, and tread each row well in with the foot. Now get some small string, tie the end to the stake at the end of the first row, give it a turn around the middle stake, then around the other end stake; carry it around the stake in the other row, and so on, up and down each row. It will be a guide to enable one to hoe the ground from the first day after the seed is planted, if thought desirable; the hoeing will check the weeds.—G. M. S., *St. Paul, Minn.*

Celery Pests.—J. E. M., Portsmouth, R. I., will find a remedy for celery pests in the following compound: Take equal parts of soot and sawdust, sprinkled with fine lime, unslaked. If he could get some rich soil from old decayed tree roots and put it around the celery at the same time, he would be astonished at the growth, He should cut the roots or nip them a little before transplanting them in the ground. He should also water them occasionally with the suds of a washing day, and urine water from cattle diluted with rain water.—William Street, *Penn.*

The Black Wattle for Streets.—A Pasadena correspondent of a California contemporary extols the Australia black wattle as a street tree. This tree probably possesses merit for all the warmer portions of the union. The tree is probably *Acacia decurrens*, although *A. binervata* is sometimes known by the same name. The correspondent writes as follows:

"As the varieties of trees available for planting in our climate are not numerous, I beg to call the attention of the parties interested to the Australian black wattle, of which tree specimens are growing on my house lot.

"These trees were planted four years ago, having been obtained from the State University. They were then small spotted plants about six inches high. They are now twenty to thirty feet high, showing a growth without any care at all, second only to that of the eucalyptus. They are evergreen acacias having dark feathery foliage and forming a fine spreading head when trimmed up from the root while growing. The standards, south of my house, show what they will do when allowed to grow naturally. Those west of Dr. McCoy's house are too close together (three feet) to show good heads. But as the row in which they stand is from east to west, and they were exposed to the full blast of last winter's norther without falling over or breaking a limb, they have proved themselves superior in this respect as a street tree, to the omnipresent pepper tree, which frequently goes over in a wet storm.

"But the crowning glory of this tree is its flowers. From the lowest branch to the topmost twig it is bursting out in one mass of glory—the flowers appearing in feathery clusters of a greenish white color, in charming contrast with the dark green of the leaves. The perfume is that of bitter almonds.

"How large the tree will grow I do not know, probably no larger than the locust or pepper. But an avenue of them planted twenty-five or thirty feet apart, and trimmed well up while growing, so as to keep the naturally drooping lower limbs out of the way of travel, would cause a deep shade and could hardly fail to add to the appearance of the neighborhood, besides breaking the monotony of the ever-present pepper tree."

The Rose.

A beautiful flower is the rose to me,
It may be white, it may be red:
In a little nook by the willow tree,
'Tis the crowning joy of the flower bed.

More beautiful still is the rose, I ween,
Whose grace of person and mind is more;
Of my blithesome heart she is reigning queen—
This is the rose whom I adore.

I. W. Sanborn, *Lyndonville, Vt.*

Notes on Shrubs in Orange County, New York.—The past winter and spring, so exceptional in their climatic conditions, were most unfavorable for cultivated shrubbery. After a winter so unprecedently mild that the ground was unfrozen throughout, and without snow, there were heavy snow-falls later in March, followed by intense cold (10° below zero). Many things commenced growth early in March as vigorously as is usual during the latter part of April, only to be killed by the severe freezing they received. At this time the ground was well covered with snow and froze but lightly, which seems to have saved the roots of many things. The more noticeable thing was that the most severe sufferers were of Asiatic origin; many of them were killed entirely, as the Japan Judas tree (*Cerris Japonica*) and

Kœlreuteria paniculata. The California privets (*Ligustrum ovalifolium*), many of the forsythias, hydrangeas, kerria, and Japanese spireas lost all but their roots, and are now making a new growth from the ground. The Japan maples suffered somewhat, but not so severely.

The shrubs of American origin that are usually later in starting into growth, as the Virginia fringe tree, Berberis, cornus and laburnum, are unhurt. The same seems true of the vines. The Virginia creeper, *Aristolochia Sipho*, and trumpet honeysuckles are uninjured, while the Chinese wistaria, actinidia and *Ampelopsis Veitchii* suffered severely. The good old fashioned things and their improved varieties did not seem to notice the unusual season, such as lilacs, viburnums, deutzias, upright honeysuckles and mock oranges. The flowers of the Japan quince and the native red maple were alike destroyed, while the Chinese prune (*Prunus Simoni*), has flowered and grown with unusual splendor. Evergreens without exception have yet shown no ill effects.—H. W. D. *Orange County, N. Y.*

How to Grow a Fuchsia.—Cut the ends off the branches of a fuchsia about four or five joints in length in November or in the spring; strip the leaves off, leaving only three or four upon the end of the cutting; fill a basin or shallow box nearly full with clean sand; pour water upon it until it is well saturated; in the sand place the cuttings about one inch apart and two joints deep; keep the sand always damp, and shade from the hot sun; place the basin or box in a warm room and the cuttings will root in two or three weeks. As soon as they are well rooted, put them into three-inch pots, and as soon as they have made growth, keep repotting them into larger pots as fast as the white or working roots come through the soil and begin to work round the pots, until they have all been put into 9 or 10-inch pots. When they have made growth after first being potted, pinch the ends off; they will then branch out. When the branches have grown again, pinch the ends off as before, leaving one unpinched for a leader or center stem. Keep pinching and potting until you get them the size and shape you want: then let them flower.

The Black Prince is one of the best, and a very strong grower. Drooping fuchsias can be made by hanging short pieces of bent wire upon the ends of the branches. Various other shapes can be made by judicious pinching and training. The soil should be two parts well rotted sod, and one part each of well rotted leaf mould and manure, with sufficient sand to make it porous. To one barrowful of this compost add two quarts of powdered charcoal, which will keep the soil sweet. Give the plants plenty of room, air and water; shade them from the strong rays of the sun; syringe the foliage well and often; keep the atmosphere warm and moist, at a temperature of 45 or 50 degrees, and fuchsias 4 to 5 feet in height and diameter may be grown in less than one year from the rooting of the cutting. Put half a bushel of cow manure into a barrel containing twenty gallons of water; stir it well up; when it has settled clear, water the plants with it once a week while they are growing; but be sure not to let the liquid touch the foliage. Tie some tobacco stems to short sticks and place two or three across the tops of the pots; substitute fresh ones once or twice a month, and neither green or black aphis will cause any trouble.—G. M. STRATTON, *St. Paul, Minn.*

Flowering Sago Palm.—About two weeks ago our largest sago palm (*Cycas revoluta*), began to show signs of flowering, by the appearance of a ball of yellowish colored mossy substance in the center of the plant. It has opened and enlarged every day until now there is a perfectly formed blossom composed of leaf-like petals, each about four inches long, the number of petals corresponding to the number of leaves the plant has borne. The blossom or flower is about twelve inches in diameter and is, in appearance, a miniature of the palm itself. The plant is eight feet in diameter from tip to tip, has always been in perfect health, and is a beautiful specimen.

Can anyone tell whether there is any record of a sago palm having flowered before in this country, and whether the plant dies after the flower reaches perfection?—GARRETT B. LINDERMAN, *Penn.*

The Garden Roses of India.—The principal garden roses cultivated in Europe and in India may be traced to western Asia and China. The old-fashioned summer roses, which were the ornaments of gardens in Europe 40 to 50 years ago, are mostly referred to *Rosa Gallica*, which has its home in south Europe and western Asia, and to *Rosa centifolia* and *R. Damascena*, which probably came from the mountains of Armenia and northern Persia. All these are distinguished by the incomparable delicacy of their aroma, and of the two last named kinds one or the other is cultivated on a large scale in southern France, Italy, Macedonia, Asia Minor, Persia, and northern India, for rose water and essence of roses (attar). The flowering season of these kinds is short, lasting a few weeks only, and it was an important event for horticulture when, at the close of the last century, the China roses were introduced in Europe. The most important of these was *Rosa Indica*, thus called by Linnæus because it was brought from India, where it had long been grown in gardens. Its home, however, is not India, but China, and its great value consists in this, that it flowers throughout summer and autumn—hence the name autumnal rose, also monthly rose (*Monatsrose*). For this reason a variety was called *Rosa semperflorens.* Another variety, described under the name of *Rosa fragrans*, distinguished by its strong though not always very delicate scent, became the parent of the tea roses. By crossing these kinds and other species with the old garden roses, the numberless varieties of hybrid perpetuals and tea roses have been obtained which now ornament our gardens in Europe as well as in India. In India nine or ten species of roses are indigenous, but with the exception of *Rosa moschata*, a magnificent climber of wide distribution, none have contributed to the production of garden roses. All have their local names in the language of the district where they grow, but—and this is a most remarkable fact—the rose has no name in Sanskrit. In some dictionaries *Java* is rendered as *Rose*, but this is an altogether different shrub, *Hibiscus Rosa-sinensis*, the well-known shoe flower (used for blacking shoes) of Indian gardens, believed to be indigenous in China and possibly also indigenous in tropical Africa. As far as known at present, the roses of western Asia have no Sanskrit name, and were not known in ancient India. Yet *Rosa Damascena* is extensively grown on a large scale for the manufacture of rose water and essence of roses throughout Northern India, as far as Ghazipur, in 25° north latitude. Hermann Schlagintweit was, I believe, the first to draw attention to this remarkable fact. It is not impossible that the western roses were introduced into India by the Mohammedans. As there is no Sanskrit word, so is there no original term for the rose in Hindoo. In most Indian languages the cultivated rose is called *gúl*, which is the Persian name. It is called *gúláb*, which really means rose water, unless, indeed, as sometimes stated by Munshis in India, *áb* in this case is a suffix with no separate meaning. In addition to their local names, some of the wild roses of Himalayas are often called *gúláb*, *bán gúláb*, (the rose of the forest, or wild rose).—*Nature.*

Appreciation.

The lady took the flowers brought by the child,
She felt her heart in deepening pleasure bound,
She kissed the flushing cheek, happy and round,
Again the offering praised, and sweetly smiled:
"You hunted long for those rare blossoms wild."
Then, with eyes growing sad, fixed on the ground.
"Would that my Ralph with woodland love were crowned—
From planes and saws he ne'er is reconciled!"
The child made answer, drumming on his cheek,
For well he knew his parent in that hour
Was praising Ralph for good work he could do,
"Please, that's the way I heard my mother speak
About my love for each wild, pretty flower,
And so I brought these blossoms straight to you."

CHARLES N. SINNETT.

The Lily of the Valley.—The substance is here presented of what a lady, well versed in floral culture, says about winter culture of the lily of the valley.

In large cities, during the holiday weeks, immense quantities of lilies are used; so much so, indeed, that in the winter months there is considerable profit made from them by those who take the pains to rear them. And, indeed, near large cities, many florists make a specialty of the business, keeping lilies in bloom from fall till spring. Even then there is a large importation of flowers to supply the demand.

As there is always a demand for these flowers in winter, the amateur gardener who has room in his conservatory or windows to spare for this purpose can make a profit by forcing these flowers for the market during these months.

Fill small pots with light, rich soil, planting as many as five or six bulbs or pips in each pot. Then bury the pots in the garden or other protected spot. Cover them lightly with leaves or straw, all so arranged that the pots can be taken up when wanted. They should remain here till the ground becomes well frozen, after which the removal of them to the window may begin, as they are needed. Care must be taken not to expose the pots to the sunlight abruptly, but accustom them to its influence in a gradual manner. Care must also be taken not to force too soon or vigorously after taking into the house, as this will weaken the flowers, which will not be so fine and hardy. Indeed, in order to develop large fine flowers, the utmost care and attention must be given them.

On removing to the house or window, cover the soil in the pots with moss; this should be put on sufficiently thick to retain moisture, and well conceal the bulbs. This covering must be always kept moist. An even, gentle heat is required; this may be supplied from a range by means of a steam or hot-water pipe, or other suitable arrangement placed near the pots, heated by a lamp. Close attention must be paid to watering, for the soil must be kept moist, and never suffered to become dry. The lily blooms before taking root; hence it is so necessary to keep them well enveloped in moss, and well supplied with water, or the flowers will be inferior, if they do not quite perish.—J. I. BAIRD, *Greenville, Ky.*

Window Boxes.—Make of inch boards a box eight inches wide and eight inches deep, and just the width of the window; bore several holes one inch in diameter, through the bottom for drainage, as window boxes require plenty of watering as they dry out very much. Also nail two strips across the bottom to raise the box off the window ledge. Do not paint the box inside, as painting injures the roots of the plants. Fill the box to within one inch of the top with good rich loam, leaf-mould and a little sand. Get the following plants and plant them in rows, the whole length of the box; the first row next the edge may be moneywort (*Lysimachia nummularia*), an attractive trailer; its shoots will hang down three or four feet, forming a back ground under the box. The second row may be blue lobelia (*L. gracilis*), which will droop about 18 inches. The third row should be of bright yellow sedum (stone crop). In the fourth row for the back-ground, plant a good dwarf scarlet geranium. Keep them well watered, and you will have a beautiful window box of fringed carpet bedding.—G. M. S., *St. Paul, Minn.*

Management of Callas.—The article "My Callas Don't Bloom," in the February AMERICAN GARDEN (adv. p. 10), has suggested to me the idea of giving you a description of my callas which *do* bloom. After an absolute rest from the middle of June to the last of August, I repot in *very* rich soil, using a fourteen inch pot. Then give water, light and heat in abundance, and the result is most satisfactory. One of the plants is over four feet high, the flower stalk measuring four feet five inches to the end of bloom, the bloom itself being 6½ inches in width. One leaf measures 11½ inches in width, and 15 inches in length. A third bloom is now opening on the same plant, and it will continue to bloom until I give it rest in June.—F. A. TAMPLET, *South Carolina.*

Skunk Cabbage vs. Rhubarb.—In the last issue of The American Garden (p. 315), the skunk cabbage is suggested as an ornamental plant. Let me suggest in its place the *common rhubarb.* In European cities this is often seen in the yards, where it is both ornamental and useful. The dark green color of the leaves is quite ornamental, and all know how appetizing the stalks are in the early spring, the plant being the very earliest which we can utilize for food. Where there is no garden, let it be planted on the lawn ; and in the same place, as a plant both ornamental and useful, the asparagus might appear.—G. G. Groff, *Pennsylvania*.

New Plant Guard.—The Hartman Company is making a useful style of tree and flower guard. It is made of steel wire, and is therefore light and durable, and does not harbor insects. It is so made that it accommodates itself to the growth of the plant.

Taste in Gardening.—Why is it that a lady may have good taste as regards dress and trimmings, and yet when she attempts to beautify the garden, make such ridiculous mistakes ! For instance, she may paint her boxes or flower pots red, and perhaps grow a geranium with a pink blossom in them, and the attention is sure to be drawn to the glaring color, instead of the plants. Or she may order her house painted green, and thus shame the trees or the grass. Or worse than all, erect in her front yard a gypsy kettle hanging between three poles, and try to grow plants in the iron pot, also painted red. I have seen the stump of a tree turned upside down, the roots in the air, with ferns planted in it. The poor things, torn from their lovely cover in the woods, and put in that abomination, were drooping their graceful heads in shame. Sea shells often border a garden bed or path, but are out of place, in some garden a thousand miles from old ocean. Here is a new field for women : plans for artistic outside adornment. Begin with your own grounds. Read, compare notes, and our gardens will be much improved thereby.—Sister Gracious.

Two Good Plants.—*Delphinium formosum* and *Artemisia stellaris* as arranged in large clumps, alternately, in a row 40 feet long, the latter five feet tall, are splendid in their colors of "purple and gold" and make a grand display of contrasting and concordant loveliness.—S. J. Hutchinson, M. D., *Michigan*.

Rocky Mountain Red Cedar.—Professor W. F. Massey asks what is meant by Rocky mountain red cedar (May, p. 311). It is merely a marked variety of the common red cedar (*Juniperus Virginiana*). That it is truly indigenous to the Rocky mountains, and of ancient standing, appears to be evidenced by the fact that it is found along the Platte, four hundred miles eastward of the mountains, and on the banks and islands of all the streams that have their head waters in the mountains, but it is not found east of the Missouri. Under cultivation in Iowa it is a far more rapid grower than the indigenous cedar of northeast Iowa and Wisconsin, is less subject to fungous troubles, and above all it is handsomer on account of its silvery expression at the point of growth, Some of the selected specimens are nearly as silvery in foliage as the best specimens of the silver spruce (*Picea pungens*). As an ornamental and timber tree for the prairies it is superior to our native species, or to any variety I have met with on this continent.—J. L. Budd.

The Winter Flora of California.—One familiar with the names of California native flowers, on looking over the catalogue of some great eastern flower firm, is surprised to notice how many beautiful flowers this state has given the world. We have scores of the sweetest things yet left, which from the nature of things we must continue to enjoy to the exclusion of the rest of the world. I do not know of any way in which they could be grown, except as they are here in this climate.

I refer to our mid-winter blooming plants and trees. These I suppose would be called alpine plants ; at least they grow on our lower mountains. While trying to bring to bay, the past winter, certain mountain grey squirrels, jack rabbits, and the lively California valley quail, I noticed these things. It causes a lover of flowers to halt, and to forget that it is December or January, to see these sweet, bright and tender things, peeping up at you from the cold wet ground, on a cold raw day when a heavy top-coat is a comfort. They do not care for cold rain or even snow. When the snow has crept down the mountain side, nearly down to the green valley below, these little beauties may be found a little further up, enjoying the scenery.

Stranger still are the trees and shrubs. Here is a fragrant laurel with its dark bright green varnished leaves, bursting freshly into bloom, its spicy fragrance, delighting its whole neighborhood; a rod away is another laurel of the same species, loaded with half grown nuts. Directly beyond is another, dropping its ripe nuts to the ground, to feed the squirrles and cunning mountain rats! The same is true of the manzanita—here a bush loaded with its bright scarlet berries ; the next bush is a mass of the sweetest flowers, too sweet for comfort, and if the day is bright, the swarm of bees around it shows that they appreciate it even if it is January. There is a scarlet flowering currant, a flame of bloom. Next is a gooseberry, bristling all over with sharp spines, and bearing modest drooping sweet bloom.—D. B. Wier, *California*.

Tulip Sport.—A neighbor of mine has in blossom a tulip bulb which has on the one stalk, which proceeds from the crown of the bulb, four distinct and well formed double blossoms. The stem is a unit for about four inches from the bulb, after which it divides into four parts, as is common in lilium and is provided with leaves at regular intervals; it is tipped with four perfect double tulips of fine coloring. Is there any possibility of this freak being propagated, by seeds or dividing the bulblets ? If so, it would prove a decided novelty in the way of spring flowers.—Edward W. Leaming, *N. Y.*

[Your curious sport could probably not be propagated. It is exceedingly interesting as a matter of plant variation.—Ed.]

North Carolina Notes.—Mr. Little (May, p. 286), must use very small offsets in growing his tuberoses, and live very far north, if they will not make blooming bulbs the first season. Here the trouble is that the large offsets will bloom and have to be culled out in growing the bulbs for sale and next year's planting. Amateurs in this latitude leave their tuberoses, amaryllis, dahlias and cannas all in the open ground all winter until they get in such large clumps that they have to be taken out and divided. I saw to-day (May 14), an old clump of *Amaryllis Johnsoni* in a Raleigh yard, with some stalks bearing over forty flowers. In the same yard *Canna Ehemanni*, out all winter, is now over four feet high, and making buds. Dahlias are also nearly as tall. My madeira vines have reached the top of the piazza. They were three feet high last of February, but the March freeze cut them down, and destroyed the bloom of an immense Banksia rose near by. I have a Maréchal Neil rose on my front piazza, well worth noting; it has now at a moderate estimate 1,000 flowers on it. It measures around the main stem 12 inches, and has four main branches measuring 6—4½—4—3½ inches in circumference. It covers over 25 feet of the length of the piazza, and is trained on wires from the eaves to the top of the second story windows. It is on its own roots. Just now Raleigh riots in tea roses, and to one accustomed to the little plants, often frozen to the ground in Maryland, the size even of the dwarf ones is immense. I daily pass a bush of Sunset, in a front yard, which is about eight feet high and ten feet through the head. Few hybrid perpetuals are planted here. Raleigh people want roses all the time—and the climate is so balmy that they get them.—W. F. MASSEY, *N. C. Experiment Station.*

SPROUTS AND CIONS.

President McA an of the Ontario Fruit Grower's Association, finds sulphur, applied freely twice during the season to the soil beneath his grape vines, a perfect protection against mildew and thrips.

The necessity for the deep planting of grape vines is forcing itself more and more upon growers. About all the old ideas in regard to grape growing are proving themselves fallacious, and here is a striking case in point.

It seems, as a result of experiments northward, that where fruit will ripen and mature fully, in a cold climate, it is superior in quality to the same fruit grown further south. The grapes of Minnesota are especially noted as illustrating this fact.

As a good, hardy substitute for the European box, (*Buxus sempervirens*,) James Fletcher, F. L. S., of Canada, recommends *Pachyotima myrsinites*, a small box-like shrub, found in the mountains of British Columbia, with slender twigs, and a profusion of shining leaves.

Clematis verticillaris, a species frequently found wild in northeastern New England and Canada, with its large mauve flowers, is a species worthy of more attention than it has yet received among our hardy climbers. It hangs out its delicate bells in the month of May.

It is not, perhaps, very generally known by those who are interested in new species of lawn shrubs, that while the black cherry of the west (*Prunus demissa*), closely resembles in fruit our eastern *P. serotina*, in habit of growth it is more like our choke-cherry (*P. Virginiana*), which makes it of peculiar value as a lawn shrub.

It is difficult to understand why any one should continue to grow so poor a fruit as the Hartford Prolific grape. That it is yet considerably planted is evident from the fact that it is on the list of all dealers; yet it has not a single good quality to recommend it. It is early, but many later grapes are more eatable at the same season.

The Superiority of the true Worden grape over the Concord is far from being yet as well understood as it ought to be. One reason is, the Concord is often dishonestly put in, by growers and dealers, for the Worden. There is really no sense in planting the Concord any more. But it is very hard to get old prepossessions out of the public mind.

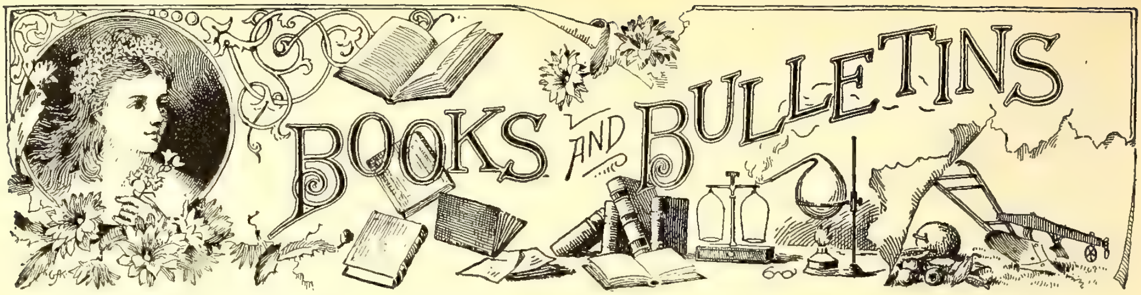
There have recently begun extensive importations of Russian and Asiatic barberries, some of them quite remarkable in growth and foliage. But these should not lead us to neglect the interesting Pacific coast species, especially *Mahonia aquifolia* and *M. nervosa* ("Oregon grapes"), which are easily cultivated, and striking in foliage, flowers and fruit.

A magnificent spirea, according to Mr. Fletcher, is the British Columbian *S. discolor*, var. *ariaefolia*, called in Vancouver island "ironwood." In the woods of that island bushes fifteen feet high may be found, while among the rocks small plants occur not a foot in height, but covered with the large feathery masses of blossoms which last from May to July.

Closely allied to the cherries is the British Columbian shrub, *Nuttallia cerasiformis*, with light green aromatic foliage, and bearing berries of great beauty. The pendent racemes of greenish white flowers are followed by bunches of large cherry-like berries, which, when half ripe, are of a pretty waxy white with pink cheeks, but fully ripe are a deep purplish black.

Perhaps, while we have so many excellent late fall and early winter apples, it may seem that any additions to the list would be superfluous. Yet, having the authority of the late Charles Downing, and my own experience of the apple to back me, I will not refrain from saying a word in favor of the Belle de Boskoop—a good grower, early and productive bearer, of good size, color and form, and very superior quality. If it proves, as I think, a longer keeper than Gravenstein, it will make an admirable succession to that apple. Trees can now be had of many nurserymen.

Vermont. T. H. HOSKINS.



Plants of New Jersey.

Catalogue of Plants found in New Jersey. *By N. L. Britton, Ph. D. From the Final Report of the State Geologist, Trenton. Pp. 642.* This great catalogue is said by the author to be "the most complete enumeration of plants of any region of as great area in the world. In fact, no such systematic study of a flora has hitherto been attempted." It is gratifying to know that this greatest effort has been perfected in America, where botany is supposed to be less developed than in European countries. The projectors of the work have been bold and comprehensive in their plans from the first, and a preliminary catalogue was issued under the same auspices a few years ago which was itself more voluminous probably than any American catalogue in existence at that time. Dr. Britton and his collaborators have labored with unusual fidelity for many years.

The catalogue comprises an enumeration of all plants —fungi, algæ, lichens, liverworts, mosses, etc., as well as the flowering plants. The total species and varieties reported in the state, an area of 8,224 square miles, are 5,641, distributed as follows: flowering plants, 1,919; pteridophytes (ferns, club-mosses, scouring-rushes, etc.), 76; bryophytes (mosses, liverworts and charas), 461; thallophytes (lichens, algæ and fungi), 3,021; protophytes, 164.

An excellent feature of the catalogue is the enumerations of "*forms*," or minor variations of plants. This is the first important step in this country toward the compilation of material for the study of plant variation. These forms are commonly considered unworthy of notice, or at least of record by most botanists, but they are, in some aspects, the most important objects in systematic botany. These forms include all conspicuous variations in colors of flowers and habits of plant which are not sufficiently marked or constant to be supposed to merit varietal names. This catalogue is also the exponent in this country of the extreme revolutionism in plant nomenclature. Between this extreme and the extreme conversatism, which is also promulgated in this country —both of which are equally unfortunate, it seems to us —the botanical laity cannot find standing ground.

Western N. Y. Horticulture.

The Western New York Horticultural Society. *Proceedings of the Thirty-fourth Annual Meeting, held at Rochester, January 22 and 23, 1890. John Hall, Secretary. Pp. 188.* The Western New York Horticultural Society is in many respects the best horticultural organization in America. Its membership is made up of eminently progressive men, who have learned the art of tilling the soil in one of the most beautiful and fertile spots upon the earth. Its meetings are always important. The present volume is even better than any of its predecessors. The editing is carefully done, and the typography and make-up are unsurpassed.

The contents are varied and substantial. The following are the most conspicuous papers: The Clematis Disease, by Professor Comstock; Late Experiences with Insects Injurious to the Orchard and Garden, by Dr. Lintner; Report upon Chemistry, by Professor Caldwell; Experiment Stations, by Dr. Collier; The Winter End of Horticulture, by Professor Bailey; The Newer Strawberries, by C. E. Hunn; Embellishment of Public Pleasure Grounds, by William McMillan; Pomological-Historical Review, by Lewis F. Allen; Evaporated Fruits, by Michael Doyle; Planting School Grounds, by J. J. Thomas. The reports of county committees and discussions fill out an unusually valuable little volume.

Onions on Plowed and Unplowed Land.

Bulletin No. 10, Minnesota Experiment Station. *S. B. Green.* This bulletin deals with a variety of topics. Mr. Green conducted, during two years, an experiment to determine the relative values of plowed and unplowed land for onions. An old onion patch was selected for the experiment, half being plowed in the spring and half harrowed. In 1888, a very wet season, the unplowed area gave more onions and fewer green necks. In 1889, a very dry season, the test was reversed with the areas, the portion which was plowed in 1888 being harrowed. Again the unplowed portion gave best results. "The results of the experiments for these two very different years show that the land not plowed, but which was only harrowed, was in the best condition for a crop of onions. This is true of this individual case, and would probably be true of any similar soil, or of any that is lighter. There has long been a feeling among onion growers that fall plowed land is better for the onion crop than spring plowed land, and I have frequently known of onion land that was simply raked over in the spring following the harvesting of the crop, and which, without further preparation, produced good crops. This experiment confirms us in a belief in the efficacy of a rather compact subsoil for onions.

"Another point of interest and value lies in the fact that both years the weeds were much the most numerous on the half which was plowed. It may be questioned if I would advise the planting the land to onions continuously without plowing? To this I would reply that it would probably be best to use the land two years without plowing, and then to plow as soon as possible in the fall after gathering the crop. By plowing thus early, the land would have an opportunity to become compacted by the fall and spring rains and snows."

Cabbage Tests.

A number of varieties of cabbages were tested at the Minnesota station last year. The following cultural points are interesting: "The past season, at the time we thinned out the plants in the hills, the weather was very favorable for transplanting, and we set out a piece of about one-fourth an acre with the surplus plants. The soil of this piece adjoined that on which we had sown the cabbage seed. It had had the same amount of manure and cultivation as that first mentioned, and been planted with the same crops for several years. As a result, the cabbage was very nice on the field where the seed was sown in the hill, while on the land to which the plants were transplanted, the crop was uniformly poor, and many of the heads did not harden up at all. The results in this case were very apparent to the most casual observer. I lay the results to the fact that the transplanted cabbage was set back and did not recover before the severe summer drouth set in, and this checked its growth.

"The more tests of this sort I make and the more seed I sow, the more I am convinced of the importance of securing seeds with good pedigrees. Every market man of large experience understands the value of this, and knows that it is foolish to waste time and money over a crop grown from poor seed. Some of the strains of Flat Dutch cabbage tested here have not produced more than thirty per cent. of good heads, while in adjoining rows was Flat Dutch, of which every plant produced good heads. Such instances might be quoted in abundance, but all go to show the importance of securing seed from a good parent stock. Vitality in a seed is a good thing, but is perfectly valueless without it is associated with a good pedigree."

Arsenites on Native Plums.

The native plums are by no means curculio proof, although the fruits are probably less injured than are those of the old varieties. The injured fruits of the native sorts usually remain upon the tree until ripe, but they ripen prematurely. Trees were sprayed with London purple "in the proportion of one spoonful to two gallons of water," the application being made three times. No injury resulted to the foliage, and great benefit was apparent upon the fruit, which, upon the sprayed trees, "was almost entirely free from blemishes." The fruit from the trees which were not treated with insecticide contained scarcely a specimen but what was injured by the work of the curculio or gouger—besides, they ripened much earlier, and were of inferior flavor and size, as compared with fruit from trees that were syringed. The foliage of the syringed trees was uninjured." It is to be regretted that the exact strength of the insecticide was not ascertained. A "spoonful" is very indefinite.

Bagging Grapes.

The results of bagging grapes were as follows: "The varieties treated were Delaware, Early Victor and Brighton. The fruit was bagged with paper bags when about the size of small peas. At the harvest, the bagged grapes were better in every case than those not bagged, but the most marked difference was with the Brighton, the bunches of which were clean, perfectly colored, and the sweetest grape I have ever eaten. Those exposed were not so good in any way, being very dusty and uneven in ripening. In our previous trials with Concord and Worden and some other varieties, the result has been uniformly in favor of the use of bags as a covering." The cost of bagging varies from one-fourth to one cent per pound.

Rollingstone Plum.

The Rollingstone is one of the newer native plums. It fruited at the Minnesota station last year, and Mr. Green thinks that it is "a valuable addition to our list of hardy plums." The period of picking extended over two weeks. A description and figures are given.

Potatoes at Different Depths.

Burbank potatoes were planted as follows: (1) On the surface and covered 2 inches; (2) 3 inches deep in furrows; (3) 6 inches deep in furrows; (4) 8 inches deep. The yields per acre of large tubers were 200, 212, 285, and 321 bushels respectively. "The crop harvested consisted of very nice smooth white potatoes, of good size. It required much labor to dig the row planted eight inches deep, and probably six inches is as deep as it is practical to economically plant and harvest a field crop of potatoes. The potatoes planted on the surface were very easy to dig, but were not as large as those planted deeper, owing probably to the dry season. In a wet season I think the results might be reversed in such an experiment."

Grapes in Central Texas.

Bulletin No. 8, Texas Experiment Station. *Work in Horticulture. By T. L. Brunk. Pp. 39.* Professor Brunk gives notes upon a great number of varieties of grapes, together with descriptions of vine diseases, and two actual specimens of diseased leaves. A useful feature of this grape test is a table which gives the percentage of injury to different varieties by various diseases.

Strawberries in Texas.

"The whole plat of strawberries was thoroughly cultivated and kept free from weeds all spring, and even during the bearing season. Some may object to this plan of culture, but on this soil, which will bake three days after a good rain, it is indispensable to keep the soil in the proper condition to resist the drouthy spells which frequently occur for a week or two at a time during the spring and early summer before the drouth of summer sets in. It is the only way to keep plants from dying during the drouth of summer. This was well demonstrated on the first rows of Charleston and one row of Wilson. The first 100 feet of these rows were carefully weeded before the ground had time to dry out in June. The remainder of the rows at the end of summer, or by the time the fall rains set in, were almost devoid of plants, while those freed from weeds in time produced a heavy matting of plants. The soil here runs to extremes much easier than any other soil, probably, in the state, therefore must be handled rapidly, just at the right time. Where the soil is sandy and not so rich, there would probably be no need of cultivation during the fruiting season; but if inclined to bake at all, it would be a great mistake to keep out the cultivator and not conserve the moisture for a dry period. Mulching will not pay in the South, and is not conducive to the best growth of the strawberry. There is nothing so reliable as thorough and constant cultivation. In places and on soils where plants are jeopardized by hot winds and baking soils, it is best in the spring, immediately after the fruiting period, to transplant some of the best plants that have grown from the runners to cold-frames or old hot-beds, where they will grow rapidly and can be protected from the sun and drying winds, and also, if necessary, in extreme weather be watered occasionally. We took this precaution, and now have abundant plants to transplant this fall. Where the cultivation in the field was not good, many have died out."

A table gives the numbers and sizes of fruits borne by different varieties and the period of fruiting, "Many varieties are at home in Texas, and I believe the small fruit industry to be only in its infancy. When irrigation is cheapened so that the average fruit grower can use it without too great an outlay, small fruit culture will then receive the attention that it properly deserves. To sum up in brief, this year's testing shows that the most reliable market berries, at least for Central Texas, are the Cloud, Hoffman, Charleston, Crescent, Sucker State, May King, Jessie and Captain Jack, in about the order named. Several fertilizers were tried, but nothing definite could be ascertained that was of value. However, the tests seemed to show that potash on this soil would prove quite beneficial. The strawberry, I think, should be thoroughly fertilized at the time of setting out, with cotton seed meal to give them a vigorous start in the fall, and then they should receive a liberal application of wood ashes or kainit, and some fertilizer, as bone meal or acid phosphate, containing phosphoric acid, in December. Cotton seed meal should be applied at the rate of 1200 pounds to the acre, bone meal or acid phosphate at the rate of 500 pounds, and wood ashes or kainit at the rate of 300 pounds to the acre. Well-rotted stable manure applied in the fall is all that could be desired. It should be applied at the rate of at least fifteen tons to the acre. A good compost is made by spreading alternate layers of cotton seed meal upon layers of stable manure, and keep shaded and wet. After well rotted it is ready to apply at the time of setting out the plants."

Blackberries in Texas.

"From one season's testing we cannot fully recommend any variety, but thus far the indications are that the Dallas, Kittatinny and Brunton are all good, prolific varieties. I have seen the Lawton growing in the state, and always without rust. This variety and the Dallas I believe to be less diseased than other varieties, and as they are also quite prolific, I would recommend them to planters as being the most reliable varieties I have yet seen in the state. Texas seems to be the natural home of the blackberry and dewberry. They form one of the most profitable fruit crops that can be raised. I know of several cases where about $500 was netted per acre. In one case the whole crop was sold at six cents per quart to a canning factory."

Raspberries in Central Texas.

"The red-cap varieties are the only ones, I believe, that will stand our medium drouths and bear enough for profits. The black-cap varieties do fairly well in North and East Texas. I would not recommend an extensive plantation of any variety of raspberry in this latitude." Turner is reported as enduring drouth the best of any variety tried.

The bulletin presents a valuable table of the best varieties of many fruits for Texas, compiled from many correspondents. A list of fruits upon the station grounds is also given.

Cut-Worms.

BULLETIN NO. 18, SOUTH DAKOTA EXPERIMENT STATION. *The Cut-worm. By I. H. Orcutt and J. M. Aldrich. Pp. 6. Illustrated.* Extensive studies of cutworms have been inaugurated in South Dakota, where these pests appear to be very abundant. The present bulletin is largely a report of progress. Of remedies, those which appear to give most promise are watering the plants regularly in the evening for the double purpose of making plants vigorous and lessening the activity of the worms, covering the ground with loose straw and then burning it off, starving out the worms, and hand-picking. Tin protectors are also efficient. "For use in the Horticultural Department, we had tins made at a tin-shop. They are two and a-half by eight inches in size, with a narrow lap at each end, forming a tube when the ends are bent round and hooked together. This is a perfect protector if properly applied. It should be inserted in the ground but slightly. In our experience, the worms did not crawl under if the tube barely reached below the surface. Lumps close outside sometimes enabled worms to climb over, so care had to be taken to leave the earth smooth near the tube. The cost of the tins was seventy-five cents per hundred. They promise to be very durable, as they are required in the field less then two months and are then taken up and put under cover until the next year. If work is counted at its usual value, they are more economical than old fruit cans."

Varieties of Potatoes in Michigan.

BULLETIN NO. 57, MICHIGAN EXPERIMENT STATION. *Vegetables—Comparative Tests, Methods of Culture. By L. R. Taft. Pp. 43.* The result of a test of 75 sorts of potatoes show "that Gardner's Early, fit for digging July 24, yielded at the rate of 275 bushels per acre. Premium, July 26, yielded 221 bushels, and Early Harvest, July 26, yielded 303 bushels. Although Gardner's Early was not planted until a week after the other varieties, it was the first of all to ripen. Early

Harvest is practically as early as Premium, and is much more productive. Following these extra early kinds within a few days are a large number of varieties that are considerably larger yielders, and should be relied on for the main early crop; among them are Lee's Favorite, Aug. 3, 376½ bushels; Timpe's No. 4, Aug. 3, 400 bushels; Timpe's No. 6, Aug. 3, 345½ bushels; Polaris, 345 bushels. Of other varieties that ripen about the same time as the above kinds, with a yield of about 300 bushels per acre, are Clark's No. 1, Gregory No. 1, Early Oxford, New Queen, Morning Star, June Eating, Mrs. Cleveland, Faust's 1889, Putnam's Early, Putnam's New Rose, Randall's Beauty, Fort Collins No. 83, and West's No. 1.

"Timpe's No. 4, Lee's Favorite, Timpe's No. 6 and Polaris are most productive. Thorburn ripened a week later and gave a yield equally as large.

"Of the later sorts, Summit was far ahead of any other in yield per acre, the total being 548 bushels. Watson's Seedling gave 395 bushels, Sutton 375 bushels, O. K. Mammoth 380 bushels, Putnam's Select 370 bushels, Rural Blush 370 bushels, Bannock 407 bushels, Copper Mine 382 bushels, Dictator 415 bushels, Alaska 375 bushels, and President Lincoln 499 bushels."

How to Cut Potatoes.

The century-worn discussion of methods of cutting potatoes has demanded much thought at the Michigan station during the past year. The "seed end" is again found to be as valuable for planting as other portions of the tuber, and single eyes again give poorer results than half tubers. Half tubers appeared to be better than whole ones of the same weight as the half.

Culture of Potatoes.

Tests of different depths of planting and of different ways of applying fertilizers gave the following results: 1. Slightly better results were obtained from fertilizers placed over the seed rather than under it. 2. When fertilizers were used, the best results were obtained from level culture. 3. Wood ashes at the rate of 125 bushels per acre gave a larger yield than 1250 pounds of prepared fertilizer, consisting of dissolved bone, sulphate of potash and sulphate of ammonia. 4. The use of stable manure gave better results than either ashes or fertilizers. 5. Manure placed between the rows as a mulch gave better results than when used either over or under the seed. "The last part of the season was quite dry, and the result might have been different in a wet season. It should also be noted that for four weeks after planting the season was cold and wet, and the great number of missed hills, particularly noticeable in the plot where manure was placed in the bottom of the trench under the seed, may have been owing to the fact that the manure acted as a sponge, and holding water, caused the seed potato to decay."

"With an open, well-drained soil, we have obtained best results by planting in trenches five inches deep and covering two inches. The trenches can be gradually filled when cultivating, after the plants are up, or better yet by dragging the field across the rows with a smoothing harrow as soon as the sprouts appear. This will level the land and destroy all weeds. A second harrowing and frequent working with a Planet Jr. or other cultivator, with level culture, will give satisfactory results."

Potato Scab.

Professor Taft treated potatoes with hyposulphite of soda, sulphate of iron, sulphur, sulphate of potash and ground bone, in the hope of ascertaining if any of these materials lessen the production of scab in potatoes. There was a marked increase of scab where hyposulphite of soda was used, but in the other instances the results were indifferent.

Varieties of Tomatoes in Michigan.

"For early tomatoes we need not look beyond the Earliest (Vaughan) and King of the Earlies (Ely). Prelude is too small. Following these are Advance and Hathaway's Excelsior. Of large, smooth, red kinds there is little choice between Perfection, Paragon, Volunteer, Bay State, Haines' No. 64, Nichol's Stone, Matchless, and a number of others. Ignotum is with us still the most solid and largest smooth tomato. Out of five hundred plants only one sported. Red Mikado is a red and regular form of Mikado. Of pink or purple varieties, Acme, Beauty and Mikado are good. Shah is a yellow variety of Mikado parentage."

Seeds from First-ripe Fruits; Early Sowing.

"From the trials of the past two years, it would seem there is little to be gained by selecting seeds from the first fruits to ripen. It is true that during both years there is on the average a slight apparent gain from such selection of angular sorts, but eight of the eighteen varieties show a loss from such selection, and we can only regard as accidental the fact that in the angular sorts the average shows a gain and in the smooth sorts a loss, where such selection is made."

It was found that it pays to start tomatoes under glass.

Tomato Trellis.

"For training the tomatoes used in our experiment work, a trellis of wire was devised. It consisted of four lines of No. 12 galvanized wire, fastened two on each side of the supports. These were made of six-inch fence boards, driven into the ground so that the upper end was thirty inches high. The wires were fastened on with wire nails, one line being fifteen inches from the ground and the other one foot above this. This gave a space of six inches in which to train the vines, and by tying them occasionally to the wires they were easily kept in place. The vines were thus kept off the ground, and the fruits were exposed to the influence of the sun and air, and picking was facilitated. The trellis was quickly and cheaply made, and the materials can be used for many years."

Beets in Michigan.

"As obtained from the various seedsmen, there was quite a variation even in the standard kinds, both in root and tops. The Eclipse gave beets of table size several days before any of the other kinds. The type of the Egyptian is being gradually changed from its original flat form to one nearly spherical. Fifty Day was as early as

Egyptian, but less desirable. Bassano still remains one of the best second early varieties for home use or for market where pink sorts are liked. Early Crimson is similar to it, except that the tops are smaller and the flesh a darker pink. Victoria is a half long blood beet, of good quality, with keeping qualities."

Cabbages in Michigan.

Following are results of a test of 36 sorts of cabbage. "Landreth's Earliest, Everitt's Earliest, New Express (Ely), New Express (Everitt) and Early Etampes are much alike in appearance. They mature at the same time and are equally valuable varieties. Early Jersey Wakefield from Ferry and Henderson is more conical, but in earliness and general value there is little difference. Closely following these varieties come Henderson's Early Summer, Early Summer Flat Head, New Peerless, New Cassell and Succession. The last three kinds are improvements on the Henderson's Early Summer, which they much resemble. The heads are large, solid and even in size. Succession, in particular, is very promising, as it is as early as Henderson's Summer and produces heads one-half larger. Two weeks later the Vandergaw and Reedland Early Drumhead matured, both of which made a good showing. They will probably supersede Fottler's Brunswick. Of the later kinds Bloomsdale Late Flat Dutch, Chase's Excelsior, Genuine Surehead, Joseph Mason, Large Late Flat Dutch and Louisville Drumhead all gave satisfactory results."

Cauliflowers.

In cauliflowers "it was difficult to detect any difference between Puritan, Gilt-Edge, Denmark, Prize Earliest, Best Early, Snowball and Erfurt, as they showed less variation than appeared between the same sorts from different seedsmen.

"We received for trial from H. A. March, Fidalgo, Washington, packets of American-grown Snowball and Erfurt seed. They were large and plump, gave strong, vigorous plants and furnished us results as good or better than is usually obtained from imported seed. The heads were large, solid and as perfect as could be desired. We understand that this seed can be furnished at a price much below that of European seed."

Sweet Corn.

38 kinds of sweet corn were grown. "Any attempt to determine the comparative values of the different varieties would be likely to prove misleading. Among the earliest sorts are Amber Cream (Cory?), Burbank's Early, Chicago Market, Early Cory, Durkee, Early Marblehead, Early White Cory, New Queen, Northern Pedigree, Pee and Kay, and Perry's Hybrid. Of the second early kinds are Early Bonanza, Early Conqueror, Minnesota, Maule's XX, Roslyn Hybrid, Shaker's Early, Stabler's Early, Acme and Triumph. Late sorts, Henderson's Sugar, Hickox's, Honey, Gold Coin, Maule's Mammoth, Old Colony and Ruby."

Professor Taft finds the best of 36 leading varieties of lettuce for hot-bed culture to be Grand Rapids, Black Seeded Simpson, Bloomsdale Early Summer, Boston Curled, Boston Market, Landreth's Forcing and Yellow Seeded Butter. For winter forcing none of them equals the Grand Rapids. Its upright habit admits of close planting, and it matures two weeks quicker than Tennis Ball or Boston Curled.

Lettuce.

In the open ground, the sorts that did well in the hot-bed made a good growth, and would probably give good satisfaction if used for this purpose. Several other kinds, however, were slower in sending up their seed stalks, and are better adapted to out-of-door culture. Among these are Defiance Summer, Hanson, Midsummer, Oak-leaved, Tomhannock (Ely). The Deacon is also an excellent sort. Green-fringed and New Queen made a good growth, but are rather coarse for table purposes. The yellow or golden kinds are rather soft and tender for ordinary planting. Chartier is a strong growing variety with the edges of its leaves a reddish green."

Peas.

Of peas, "the earliest varieties were Bergen Fleetwing, First in Market and Best Early, although ten other sorts followed within two days. The most productive of these early kinds were Philadelphia Extra Early, Bergen Fleetwing, Alaska, Rural New Yorker, First and Best and Maud S. Between these varieties, the difference in earliness and general appearance is very slight. American Wonder is a dwarf variety which ripens about as early as any; it is quite productive, and better in quality than the half dwarf sorts.

Of the second early varieties the most valuable were Everbearing, Dr. McLean, Fill Basket, Market Garden, John Bull, Advancer, Pride of the Market, Quantity, Stratagem and Saint Desirat Melting. Of these, Pride of the Market, Market Garden and Dr. McLean gave best results.

"The late sorts, American Champion, Forty-fold Evolution, Sanders' Marrow and Yorkshire Gem made a strong growth, but were attacked by mildew before the crop matured."

Notes of radishes are also made, but no summaries are drawn.

Strawberries in Kentucky.

BULLETIN No. 25, KENTUCKY EXPERIMENT STATION. *Strawberries. Pp. 8.* Of 25 kinds of strawberries tried at the Kentucky Experiment Station, upon a rich garden soil underlaid with clay, Bubach No. 5 alone receives a perfect mark in a scale of 10 for market purposes. For home use, Jessie, Henderson, Gold, and Gandy receive a 10. In quality, Henderson and Gandy stand 10, and Parry stands at 0. In productiveness, Itasca, Bubach No. 5 and Lida receive a 10. "From our observations this year the following new varieties would seem worthy of trial for market: Jessie, Bubach No. 5, Haverland, Warfield's No. 2, Itasca, and perhaps the Crawford; and for a late berry, Gandy's Pride. For family use the Jessie, Warfield's No. 2, Itasca, Crawford and Henderson, and for a late berry, Gandy's Pride would be a good selection." These are interesting results, to be commended for their definite character, and worth comparison with other tests. L. H. B.

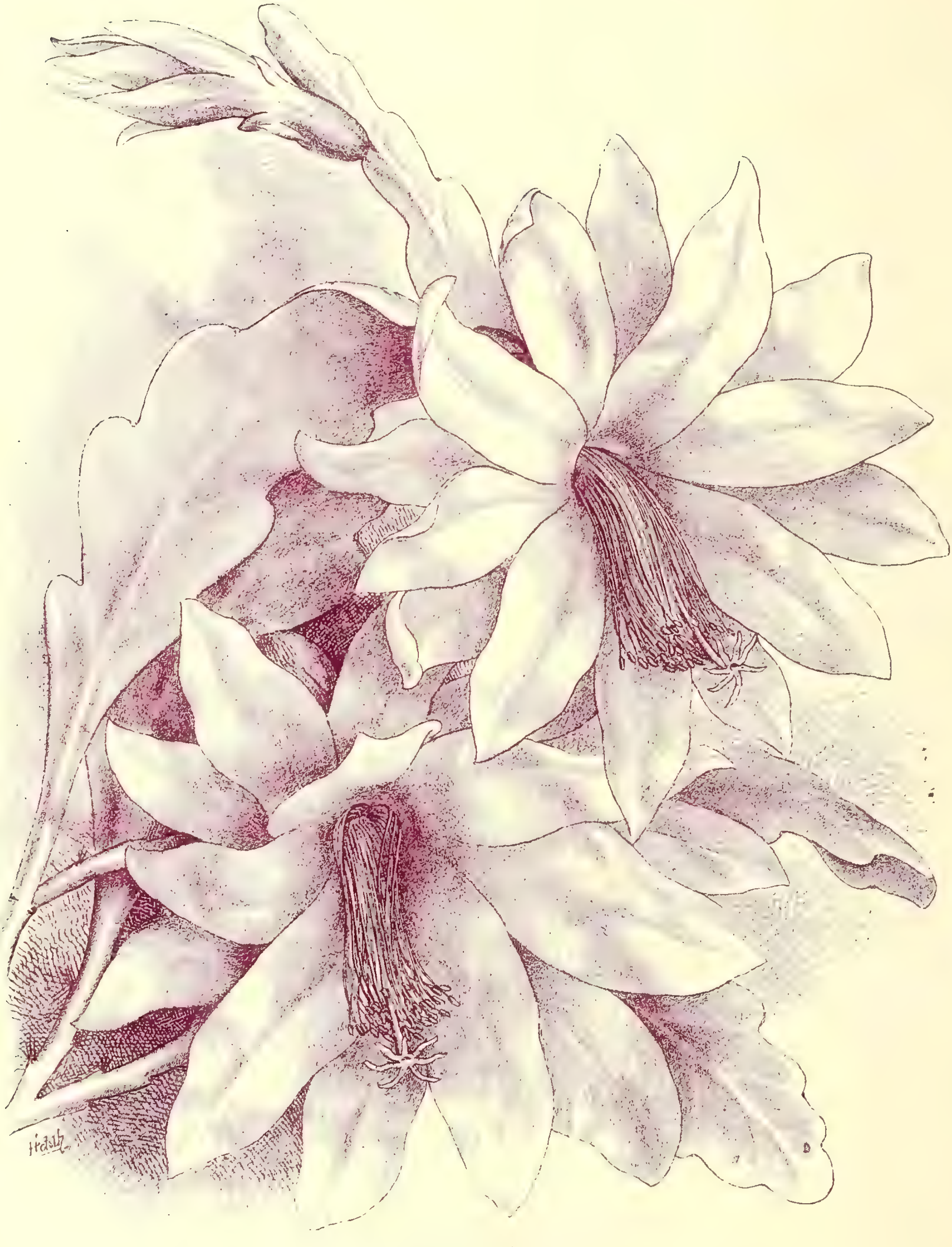


Fig. 1. Phyllocactus Ackermanni.

One of the very best of the red-flowering Phyllocacti. (See page 448.)

The American Garden.

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OUTSIDE THE GARDEN.

SOME RELATIONS OF BOTANY TO HORTICULTURE--THE BOTANIST IS WILLING TO CLIMB THE GARDEN FENCE.

PROFESSOR TRACY, in 1877, made the statement before the Michigan State Horticultural Society, that horticulture had advanced but little in the past 150 years, except in two directions. The greatest progress had been made by botanists, who had by systematic efforts originated new varieties. Progress nearly as great has been made by the entomologist in his systematic warfare against insect enemies. Probably the statement is as true in 1890 as it was thirteen years ago. We should certainly, also, at this time, credit the botanist with many investigations of the life history of the lower forms of plant life, which are injurious to cultivated plants, and in discovering remedies for many of those most destructive.

Botany, as taught to-day by the best teachers, is emphatically a science in which the student is sent directly to nature for his facts. In this way he becomes an accurately trained and reliable observer. He applies numerous questions to his plants, by observation, trying many experiments, and in studying their behavior ; in this manner, the student cultivates his judgement and learns to draw correct conclusions.

Well grounded in systematic botany, he is likely to avoid falling into numerous errors so often made by persons who learn horticulture as a mere trade. This systematic side of botany is indispensable to one in distinguishing and naming plants in cultivation, and in observing their affinities.

Geographical botany may teach of the soil and climate in which a certain plant thrives, and how to treat it when carried to a new country. Here, however, experience, experiment and the judgement are all valuable aids. Plants are not always found in a wild state where they will thrive best. This is true of many of our weeds, and of many plants cultivated for various purposes.

Who will point out the relationship of plants and find suitable stocks on which to "work" our cultivated shrubs and trees ? The botanist. And the botanist will know better than to attempt a union of scions of chestnut on stock of horse-chestnut—something actually attempted by a horticulturist of my acquaintance. The resemblance of the fruit of the one to the seeds of the other deceived him into thinking the union practicable.

No one, excepting a systematic botanist, would be competent to visit foreign countries to select new plants worthy of cultivation. Systematic botany is not only essential in identifying, describing and classifying plants, but it is well equipped with all the necessary paraphernalia in the way of technical terms and methods to perform the task of describing in an exact manner, all "artificial" forms that have been bred or selected. The time has already come for more accurate and complete descriptions of varieties and races of vegetables than have yet been written.

Cultivated varieties of strawberries are usually described by the fruit, with a few references to the leaves and possibly to the length of the stems. The botanist who had never compared the runners, the inflorescence and the flowers in detail, will be surprised to find that in them we have very marked differences which could well be illustrated and described. Fifteen years ago or more, I discovered this fact and described some varieties, though the descriptions were never published. I have described 150 varieties of apples by a careful examination of inflorescence and flowers, in most cases making drawings to equal scales. There are now so many varieties of cultivated fruits, that we need to make use of all the good characters that can be found to aid in making complete characterizations.* I have many times made the statement that no variety of fruit can now be called well described, unless the peculiarities of inflorescence and flowers are considered in connection with every other characteristic feature.

A knowledge of systematic botany will enable a teacher or the worker in horticulture to group his information, thus greatly aiding the memory and shortening the process of giving or receiving instruction. He learns that plants known as cucurbitaceæ have monœcious flowers, which must be pollinated by insects, wind or by hand; that they love heat, are sensitive to frost, that similar insects prey upon many of them. The garden plants known as cruciferæ have many peculiarities in common, well understood by botanists, such as a pungent, watery juice, the seeds starting early, the young plants enduring some frost, and in many cases the same insects trouble numerous species. He learns that seeds of the umbelliferæ have a low vitality and are slow to germinate. These are but a few examples out of many which could be given.

The botanist understands why some varieties of strawberries, apples and other fruits frequently fail to "set fruit," and in some instances he can prescribe a remedy. He has learned to see that the visits of insects to the flowers aid in ensuring a larger crop of fruit, as he knows that the showy portions of the flowers are hung out as mere advertisements, to attract insects; that surplus pollen and nectar are placed in the flowers as wages to reward and encourage their visits.

Some knowledge of botany, at least, is essential to aid the judgement in selecting with intelligence the sorts that may be crossed or hybridized. It is also often a great help to a person in quickly detecting some vile weed which has just made its appearance, while the unbotanical might scatter quick-grass and other troublesome pests far and wide over his premises before he became aware of their presence. A knowledge of the shapes, sizes, colors, markings and internal structure of seeds is valuable to the horticulturist, enabling him to distinguish the true from the spurious.

The trained eye of a botanist is necessary to aid one to see beauties, defects, harmonies and incongruities in selecting, combining and arranging trees, shrubs, flowers and foliage plants to best advantage for producing the most pleasing effect at the least outlay of money and labor.

The man who knows the structure of a tree and how it grows, would at least be amused at the following statement, once made by a "practical" man at a meeting of a state horticultural society. To kill the insects on leaves, to add health and vigor to a fruit tree and cause it to produce abundantly of luscious fruit, he bored a hole into the trunk of the tree, filled it with flowers of sulphur, and secured it with a plug. He was careful to avoid boring very far into the tree because he might thereby injure its heart! A knowledge of vegetable physiology teaches a person the effect on a plant of flowering, of seeding, of high cultivation or poor cultivation, of root pruning, of pruning the top at different seasons of the year. It teaches how to manage plants for producing flowers, and how to manage them to prevent their flowering.

A person might as well attempt to become a surgeon without a knowledge of human anatomy and physiology as to become a horticulturist without botany. The horticulturist who merely learns the trade will not so quickly change his practice and adapt himself to the new circumstances of a different climate in a remote country, as the one who has studied well the principles of plant growth. Many worthless experiments have been made, wasting time and money, attributing results to wrong causes, from a lack of a knowledge of plants.

No horticulturist without a thorough knowledge of the principles of several departments of botany is capable of planning and conducting and interpreting experiments. Think of the time occupied in making experiments, in discussing the subject in the press and in conventions on the cause or nature of pear blight!

In horticulture, in most respects, botany will make a person more capable. It will make him a good observer, improve his reason, strengthen his judgement, cultivate his taste, broaden his views, weaken his respect for the traditions of his fathers. It will sharpen his wits, make him a reliable investigator. It will enable him to become a leader instead of a follower.

Who, not a botanist, could ever have imagined half of the bright thoughts stated by Asa Gray in his essay "Were the Fruits Made for Man, or Did Man Make the Fruits?" Here, among other things, he discusses what our pomology would have been if the civilization from which it, and we ourselves, have sprung, had had its birthplace along the southern shores of our great lakes, the northern

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(*) The reader who desires to pursue this subject further is referred to Rep. Mich. Pom. Soc. 1873, Proc. Amer. Pom. Soc. 1879 and 1881, Amer. Naturalist 1886.

shores of the Gulf of Mexico, and the intervening Mississippi, instead of the Levant, Mesopotamia and the Nile, and our old world had been open to us as a new world, less than four hundred years ago.

Who, except the botanist—Darwin—could have written two of the most suggestive and valuable works ever produced as guides to the horticulturist? These are, first, "Animals and Plants under Domestication," second, and in my opinion most valuable of all books to the horticulturist, "The Effects of Cross and Self-Fertilization in the Vegetable Kingdom."

The former is the easier to understand and the more popular—it has been much read and quoted, and has already made a lasting impression on horticulture; the latter has yet apparently scarcely produced an impression, and was undoubtedly written in advance of the times.

The Gardeners' Chronicle remarked, upon the advent of this latter book: "For our horticultural readers the great value of Mr. Darwin's last work consists in the practical applications which follow from the author's very numerous, protracted and laborious experiments, *yet it is certain, that those practical results will be a long time filtering into the minds of those who will eventually most profit by them.*" The lines which I have italicised are prophetic.

It is now over fourteen years since this book appeared, yet we have heard of scarcely any horticulturist who have practiced what Mr. Darwin showed to be advantageous. I have heard of nothing that has since been done in a practical way, in Europe, to confirm or disprove the experiments of Mr. Darwin. In this country, I have not heard, as I now recollect, of a single instance of experiments in this line, excepting some which I conducted soon after the book was published.(*) These results were presented at several conventions and a report printed in several journals, yet no one seems to have taken any note of them.

The following from Mr. Darwin's book should be committed to memory by every progressive horticulturist: "It is a common practice with horticulturists to obtain seeds from another place having a very different soil so as to avoid raising plants for a long succession of generations under the same conditions; but with all the species which freely intercross by the aid of insects or the wind, it would be an incomparably better plan to obtain seeds of the required variety, which had been raised for some generations under as different conditions as possible, and sow them in alternate rows with seeds matured in the old garden. The two stocks would then intercross, with a thorough blending of their whole organizations, and with no less of purity to the variety; and this would yield far more favorable results than a mere exchange of seeds."

A thorough knowledge of botany will every day add much to the pleasure and satisfaction of the horticulturist, as plants in various conditions in the ever changing seasons are everywhere about him in great variety and profusion. Such knowledge is indispensable to enable him to receive the greatest benefit possible from a visit taken in any country at any time.

I must say a word in regard to that garden fence which is mentioned in your May leader, "A New Science." Thirty or forty years ago, nearly all the gardens to be found on our best farms were surrounded by a high picket fence to keep out the hens, the pigs, the puppies and stray cattle. It also served pretty effectually to keep out the horse and cultivator and a regular and liberal supply of barnyard manure. Within such enclosures, small fruits and vegetables were usually much neglected, few in quantity and poor in quality, or if well cared for, the labor was performed by hand at great cost of sweat and muscle. More recently, in place of the picket fence, an evergreen hedge has sometimes enclosed the garden patches, but in modern times, tidy farmers usually keep fowls, swine and other live stock securely enclosed, and have torn down, carried away and abandoned the garden fence altogether. Even the evergreen hedge is not now considered essential. As the farm garden has now become more easily accessible and better planned for convenience, for tillage by horse and cultivator, it is better kept, more interesting, oftener visited and more profitable.

Considering all of these modern improvements, including a much greater assortment of fruits and vegetables of new or improved sorts, and also observing of late the increased enthusiasm and intelligence given to horticulture, the botanist is more than willing to call around occasionally to visit the gardener, look over his asparagus, praise his lettuce, test his strawberries, and see how his cantaloupes are progressing. Perhaps the older botanists neglected the garden because of the formidable pickets of the fence, the want of interest manifested by the proprietor and the poor show for "garden sauce." But since things have improved, botanists are becoming more attentive. Darwin has already observed the roots of the turnips, the bulbs of the onions, compared the cabbage heads, studied

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(*) See Amer. Journ. Sci. and Arts, May, 1879.

the curling tendrils of the vines, examined the peas in the pod, told how the bees benefit the bean crop, and how and why the slender stems manage to climb to the top of the poles and swing around in seach of objects still higher. He has not neglected the esculent tuber from America, nor forgotten to grapple with the changes of cion as affected by the stock.

Many other botanists have already condescended to examine, often suggesting remedies for anthracnose on wax beans, mould on lettuce, rot on tomatoes, smut on onions and sweet corn, and rust on blackberries. And above, the reader has just seen that some systematic botanists are beginning to see that the berries, the pomes, the drupes and the vegetables of horticulture are worthy of their attention and careful study. With a very little advertising, some fruits in place of leaves to pay for his visits, the botanist will describe and classify in workmanlike manner those cabbage heads; the beets and carrots, and potatoes will receive like attention, and even those hybrid strawberries, roses, pelargoniums and castor-oil beans will yet be perfectly described and after some fashion classified, though owing to former neglect of the proprietors, these plants may not be eligible to record on account of defective pedigrees.

With a little more attention to his own intellectual improvement, as well as to be able to raise larger crops of rhubarb, egg-plants, cauliflower and finer hollyhocks, there need hereafter be no fear of neglect of the botanist to lend a helping hand wherever he can make himself useful. He is already beginning to make photographs and herbarium specimens, so far as practicable, of all the sorts of vegetables, fruits, flowers and foliage plants, not only of the edible portions at the proper stage of growth, but likewise the buds and flowers. He is giving much attention to the seeds of plants, also, their structure, vitality and points for classification. With the advent of the agricultural college and the experiment station, the botanist hereby solemnly promises in the future to be more attentive to the wants of the neglected sister, horticulture. Flora and Pomona shall henceforth begin to regain the homage paid them in the days of Homer, and much good shall follow the worship of the sisters.

Michigan Agricultural College. W. J. Beal.

ACKERMANN'S PHYLLOCACTUS (*Phyllocactus Ackermanni*).

Fig. 1, Frontispiece.

Phyllocactus Ackermanni, Haworth, Synopsis Succulentarum, 1819. *Cereus Ackermanni*, Lindley, Bot. Register, t. 1331.

The species of the genus phyllocactus, which, all things considered, is undoubtedly the most important genus among cacti to the florist, naturally fall into two series: the first series is characterized by red or deep pink flowers, which persist for more than a day, and the second by flowers which are white or whitish inside and are usually sweet-scented, and some of which are ephemeral. In the red-flowered section, *Phyllocactus Ackermanni* is undoubtedly the most valuable species. The flowers are a bright shining crimson, and measure from six to eight inches across. The outer sepals are small and bract-like and more or less scattered, a character which distinguishes this species from *P. phyllanthoides*. It is one of the freest bloomers of the genus. The species is particularly interesting from the fact that it has been a parent of many interesting and valuable hybrids. It has been hybridized even with *Cereus speciossissimus*, and probably with other cereuses. Hybrids between it and *Phyllocactus crenatus* are well known. In fact, *P. Ackermanni* itself was at one time supposed to be a hybrid, but the evidence now appears to be clear that it was taken to Europe from Mexico early in the century by George Ackermann, for whom it is named.

The other important garden phyllocacti are as follows:

A. Flowers red—

P. phyllanthoides.—This is one of the best known species, and one of the freest bloomers. The flowers are about half the size of those of *P. Ackermanni*, and the outer sepals are long and spreading. The color is usually disposed in irregular streaks of bright rose and white.

P. biformis.—This is the disocactus or disisocactus of Lindley. It is at once distinguished from all other species by its flowers being terminal on the branches, and by the very few sepals and petals. The flowers ars rosy pink, small and short-lived. The plant is erect, rarely reaching 3 feet. It is regarded as intermediate between phyllocactus and epiphyllum. In an ornamental way it is probably the least valuable of the genus.

B.—Flowers whitish-centered, ranging from yellow to orange or pink on outside; usually fragrant.

P. anguliger.—A singular species, characterized by large and blunt saw-like teeth or lobes on the branches. The flowers are from three to five inches across, white inside and light orange outside.

P. latifrons.—This is the largest plant of the genus, and one of the very best for cultivation. It sometimes attains a height of ten feet. The flowers are about six inches in diameter, creamy-white inside and reddish outside. This is now one of the most popular species.

P. Hookeri.—This is a small-flowered but free-blooming old species. It possesses a most agreeable odor. The petals are white.

P. Phyllanthus.—This has been in cultivation longer than any other phyllocactus, and it is desirable because of its associations. Its intrinsic merits are not great, however. The flower is creamy-white, long-tubed, fragrant ; it opens at night and perishes the next morning.

P. crenatus.—This is one of the very best of the genus. The flowers are six to eight inches in diameter, with pure white petals and brownish inner sepals. The flowers open during the day and persist for several days. Many hybrids have been produced between this and the red-flowered kinds, particularly with *P. Ackermanni*, giving many soft intermediate tints, adding to the attractiveness of this desirable genus. L. H. B.

The late Patrick Barry, of Rochester, N. Y

AN OLD-FASHIONED COUNTRYSIDE.

IT IS now early in May as I write, and the weather is more like the usual California March than in any season I remember. June time will be the "one perfect spring-tide," so late and long were the winter rains. The land was full of wild flowers many weeks ago, but the skies have been too changeable for long expeditions into the hills; the rains are only now ceasing in light, warm showers and mingled sun and cloud. In February, though the long southern slopes of the foothills that border our valley, were sweet and elastic with wild oats and grass growing ever since the first November rains, yet there was too much cold and dampness to justify picknicking or long explorations for the first flowers of the season. One chose, instead, to climb the vast rock-masses that project from the mountain sides like the old "hill-forts" of forgotten tribes of men, for here in the moist, warm crevices are the earliest flowers of the year, white blooms of wild strawberry, and glistening flames of the California poppies.

When April came this year, it began with sunshine, and soon there were more flowers in bloom in the valleys and on the hills than in any year I remember since the spring that followed the famous "wet winter" of 1861-62. But after a week of sunlight came another rain, and then more sunshine, and gentle spring showers, such as California does not often have, and grasses, clovers and wild flowers that had almost disappeared from our district, were seen once more, as in the pioneer days before a plow had been started in Alameda.

As April closed and may began, the especial charms of this marvelous year of great rains and luxuriant growth were such as to impress even old Californians. "Where have all the new flowers come from?" asks my neighbor who came here only a few years ago, and is planting a young orchard in an old long-pastured field. I cannot quite understand it myself, this sudden appearance of wild bulbs and annuals in the valley where they have not been seen for at least 20 years. They must have "held on" all this while, in hidden corners that plow and scythe could not reach, under fences where the most nomadic heifer was unable to crop them, or else the seeds must have lain unsprouted through ordinary seasons, to spring to life in this year of extraordinary rains. It is not only that the hill-pastures are rosy with dodecatheons, brown and golden with wild violets, snow white with gillias, blue with the heavenly azure of nemophilas and the darker shades of larkspurs; but these, and an infinite multitude of others, are down in the orchard-planted valley, not in hosts, to be sure, but in shy and beautiful groups, conscious that only once or twice in a quarter of a century can they again blossom in the lovely valley where of old they covered hundreds of acres. On the creek-bottom pastures are "cream cups," lupins and eschscholtzias now, very rich and glowing, over a few acres; forty years ago, the whole valley, containing a hundred square miles, was white, golden, rose-colored, purple, azure, in mile-wide masses of color at this April-May season.

I remember it thus in my childhood, when one could gather fifty or sixty different species of wild flowers on the old valley-farm; when they were weeds in the wheat fields, and even grew unplanted in the little garden plot where lilacs and roses were set. Alas! we sowed and tended many a loudly-advertised "novelty" that was not half so fair as the collinsias and pentstemons that were natives of the generous soil.

In the rich southern counties the roads begin to be dusty; here in central California they are in perfect condition; further north they are yet hard to travel, and will be for a month longer. On the lowlands farmers are sowing barley and planting potatoes; on the uplands the barley fields have already headed out, and hay cutting has fairly begun. The rivers of the Coast Range, such streams as the Trinity, the Gualala, Russian, Sonoma, Pajaro, San Lorenzo, Salinas, and all the rest clear down to San Diego, are clear as crystal, and yet full-flowing and strong, while on their banks tangle wilder growths of grape vines, clematis and azalea than for 20 years past. The greater and wilder rivers of the Sierras, that flow down from snow height and glacier to the lowland plains, are full to the brim. Such famous rivers as the Merced, Mariposa, Calaveras and Chowchilla, whose very names are musical, sweep past pink-blossomed apple orchards and golden-fruited orange groves, and if one climb upward along their courses, he will soon find early spring, and then winter, still clinging to the mountains. Forty miles east of the orange groves of Oroville, the snow still lies deep on the ground, and the grass blades are still under the sod. It will be July on these high, forest-covered ridges before the bloom-season comes, but how wonderful and exquisite a season it is no one can possibly explain to others. There, in the Sierras, above the line of wheat fields, the wild gardens long lost to the valleys will doubtless remain for years to come.

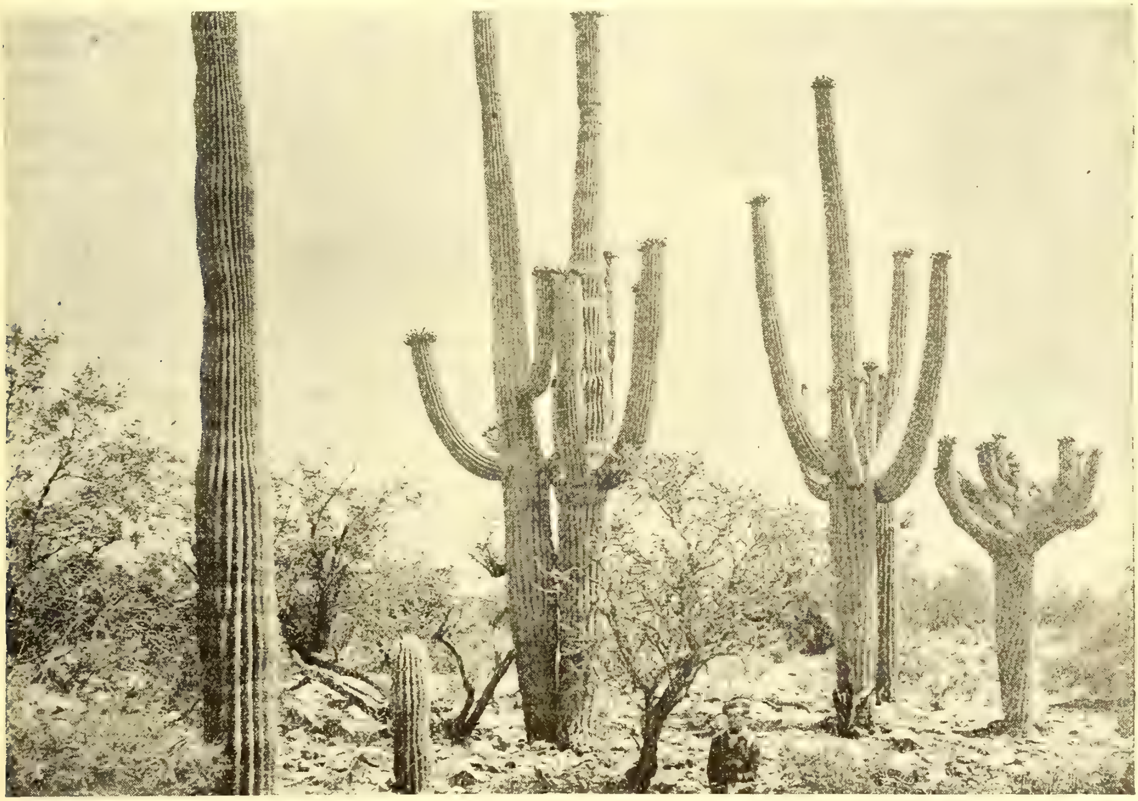


FIG. A. A CACTUS LANDSCAPE. (*Cereus giganteus.*) (See page 459.)

The gardens that men have planted in these coast range valleys are at their best now. I hesitate to attempt to describe the fullness of their bloom, lest the reader refuse to believe it. Near where I write are yucca stems eight feet high, the flower spike occupying half that, and containing so many flowers that no one has yet had the patience to count them. The Banksia roses, white and yellow, climbing to the roof together, and the white La Marques, have just been photographed to keep at least a suggestion of the vast mound of bloom, and the trailing rose-set branches that touch the ground as if drops were falling back from a swift-flowing rose-fountain as large as an ordinary cottage. Orange flowers whiten the trees, where yellow fruits, still ungathered, shine through the leaves. The snowball tree is raining its multitudinous petals on the lawn, and the Japanese quince hedge is still scarlet, though it has been blooming since January. The tulip tree's lovely flowers of delicate golden and translucent greens are breaking out of their spindle-shaped sheaths. The Japanese pæonies are past their prime, but the Japanese maples are so brilliant that they shine in the midst of the shrubberies like giant tulips from some Saturnian garden, rose-tinted and scarlet, growing among the dark green and pale golds of acacia and lemon tree, and tall feathery sprays of bamboo.

As one walks along the country roads and pathways this perfect spring weather, it is evident that some of one's neighbors are suffering keen and well-deserved regrets. Now is the time when the lazy man who has planted no garden, and has neglected his peas with no excuse, and has failed to sow his peppers and serenely tend his doubtfully fragrant tomatoes, begins to feel the stings of conscience and the premonitory pangs of retribution. It serves him right! Well he knew, months ago, that the rains would cease and the sunshine come, in which pea-blossoms would swell into fair round pods, turnips wax large, beet-leaves grow purple, and the whole garden become a dividend-paying institution. The unhappy, gardenless, dilatory, and envious householder can only go out and take note of these omissions, make horticultural resolutions of scope and dignity for another year, buy his vegetables, and haggle with the basket-laden Chinaman, Happy for him if he has a lawn and flower garden, in which are roses white, creamy, pink, crimson, blooming in all their nameless combinations, until his vegetarian peccadilloes are no more remembered.

The man who comes to California from some more rigorous climate is usually the one who worships most ardently in the temple of Flora, and plants with broader and more liberal plans for the future. The old settlers in this quaint country-side never make any effort to utilize the soil and climate to their fullest extent. Years ago oranges, olives, lemons, palms were planted by a few farmers, and they have grown and thriven greatly. But almost everyone else has planted just what he happened to know best, in New England, or New York, or the west, or the south, and so one finds a staid and settled aspect here that hardly another district in all California possesses. One knows at once, without a question, that these farmers settled down in '49, and have lived here ever since, and that they are contented and prosperous, so that there is no land to sell, no "boomers" laying out town lots in the quiet little villages, no anxiety to have the rest of the world hear of the region. On the whole, this utter unconsciousness of any existence outside this broad, peaceful valley is the strongest characteristic of its people. It is within thirty miles of San Francisco, and all around it farms are being "subdivided and put on the market," but along these old lanes the ancient pastures are being set in orchard by the pioneers themselves, and they will reap the returns. Perhaps it is a strong infusion of the New England elements that has chiefly developed this refreshingly conservative society, but to whatever cause it may be attributed, it seems likely to long continue to be prosperously old-fashioned and a conspicuous ornament to western America.

Indeed the district has not the smallest ambition to become suburban and full of cottages, summer boarders from the city, and town-lots built on by young clerks and daily train-goers. Everywhere else, where the distance and natural resources will permit, the one delicious hope of the country-side is to be "discovered" by the newspaper man and the real estate speculator. When these come to southern Alameda, the ancient "Valle de San Jose" of the Mission Fathers, they find that everyone beams with unbroken content, and will not pay five cents for a "boom" that would build a thousand new houses a year. Small farms of from ten to forty acres are becoming the rule now, as the old settlers divide them among their children, and their is today less than a hundred acres of land that can be bought in all the region, and that in small, scattered parcels. This is an unusual story for California, of which the late Professor Henry Norton of the State Normal school once wrote that "no other State in America was so much for sale from end to end and side to side." For that very reason, this is perhaps the better worth putting on record.

CHARLES HOWARD SHINN.

Alameda Co., California.

SOME STUDIES OF ROOT-GRAFTING.

THE PRACTICE of grafting upon pieces of roots originated with Thomas Andrew Knight so long ago as 1811. His first experiments were upon pears, but he extended the operation to some stone fruits. Knight supposed that root grafting would prove useful only in the case of rare plants which could not be readily increased by seeds or cuttings. But it has become a widespread practice in the United States for the propagation of various fruits, particularly the apple. Its use has introduced several knotty problems into our pomology, some of which have been discussed these many years with no apparent hope of solution.

We ought to be able by this time to arrive at definite conclusions concerning some of these perplexities. And there are, no doubt, facts enough in the possession of nurserymen and fruit-growers to settle them, but there appears to have been no analytical and judicial attempt to record and digest such knowledge. It is the purpose of this essay to classify advantages and disadvantages, in the hope that some definite information may be obtained. Such personal opinions as I have expressed are the result of much study extending through a considerable length of time; but I am aware that all of them may be wrong.

The graftage of fruit stock may be analyzed as follows:

1. Budding.
2. Grafting proper, including
    a. Whole-stock-grafting,
    b. Piece-stock-grafting, including
        (*a*) Crown-piece-grafting,
        (*b*) Piece-root-grafting, or root-grafting proper.

The advantage of budding over the grafting of whole roots lies chiefly in the ease and cheapness with which the operation is performed. The disadvantages are chiefly two: budding does not allow of deep setting in order to induce roots to form from the cion itself, and it sometimes makes a crook in the base of the tree. In the old apple-growing regions, the first disadvantage is of small account, but in parts of the west and northwest it is essential to procure trees "on their own roots" by setting the cion deep.

The advantages of whole-rooted trees, whether budded or grafted, lie in the production of a deeper, finer and more symmetrical root system than appears to be produced by piece-roots, and in the fact that such trees make a better growth the first two or three years, due to the greater force which resides in large roots. The disadvantages of whole roots are two: the greater cost of the trees; the roots are so large that they are not readily set deep enough to allow roots to strike from the cion.

The advantages of crown-piece-grafts over root-grafts proper or piece-root-grafts are said to be many, but I have not had opportunities to study this matter fully, and therefore cannot express a definite opinion. It is maintained by many that the crown-piece produces a more vigorous growth than the lower pieces, that it is hardier, and that the union with it is better. The crown-piece is usually larger and stronger than lower pieces, and larger and better cions are commonly used upon it. But the differences in behavior between crowns and roots are probably due quite as much to relative sizes and lengths in individual cases as to differences in structure and position. The notion that the "vital energy" resides in the crown is, of course, untrue.

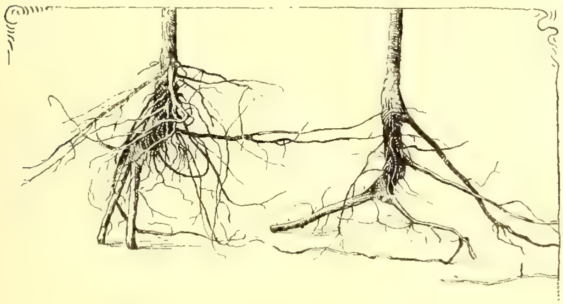


FIG. 1. BUD AND ROOT-GRAFT.

The advantages of piece-root-grafts are these: 1. They cheapen propagation by making two or more trees from one root. 2. Allow of deep setting, in order that roots may start from the cion. 3. Allow the propagation of rare plants which cannot be increased readily in other ways. 4. Accelerate or induce the rooting of cuttings by working the cutting upon a temporary root, as the quince upon the apple. This is essentially the same as 2, but the root is never expected to be permanent.

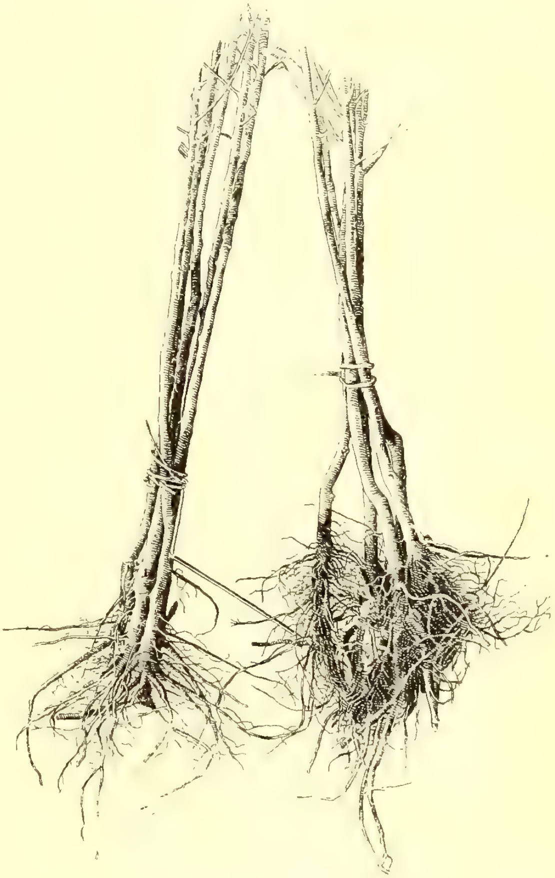


FIG. 2. THREE-YEAR-OLD PIECE-GRAFTS AND TWO-YEAR-OLD BUDS.

The disadvantages of piece-root-grafts are certainly two: 1. The roots are comparatively weak the first year or two, and the tree makes a shorter growth than upon whole roots. 2. The roots are apt to be prongy, one-sided and shallow. It is said, also, that piece-rooted trees are shorter lived than whole-rooted trees, that they are more apt to twist or tip over on high and hard subsoils, and that they are less hardy; but upon these questions I do not care to express an opinion.

The comparatively weak growth of piece-rooted trees in the nursery is well known. The amount of growth of course depends upon the amount of root used, the soil and the length of the season, but as ordinarily made in the eastern states, the piece-rooted tree usually does not make sufficient growth the first year to form the body of a good tree. And this is certainly sometimes true of western grown trees, for the poorest trees that I ever set were root-grafts from a leading nursery in one of the prairie states. The terminal bud of the first year's growth is apt to winter-kill, causing a crook to form in the trunk. It is a common practice to cut back the first year's growth to two or three buds. The root is then strong enough to push out a good growth the next year. In Figs. 2 and 3 the relative growths of whole-rooted and piece-rooted trees are shown, as well, also, as the root systems. Fig. 3 shows, at the left, a small bundle of two-year-old piece-roots, and opposite a bundle of two-year-old buds. Fig. 2 shows, at the left, three-year-old piece-roots and, on the right, two-year-old buds. Fig. 1 also shows the same differences. All these trees are Mann apple, procured in western New York. These represent about the average comparative sizes of trees of all varieties which have come under my observation, and a series of photographs sent me by C. M. Stark, of the Pike County Nurseries, Missouri, shows similar differences in size and shape.

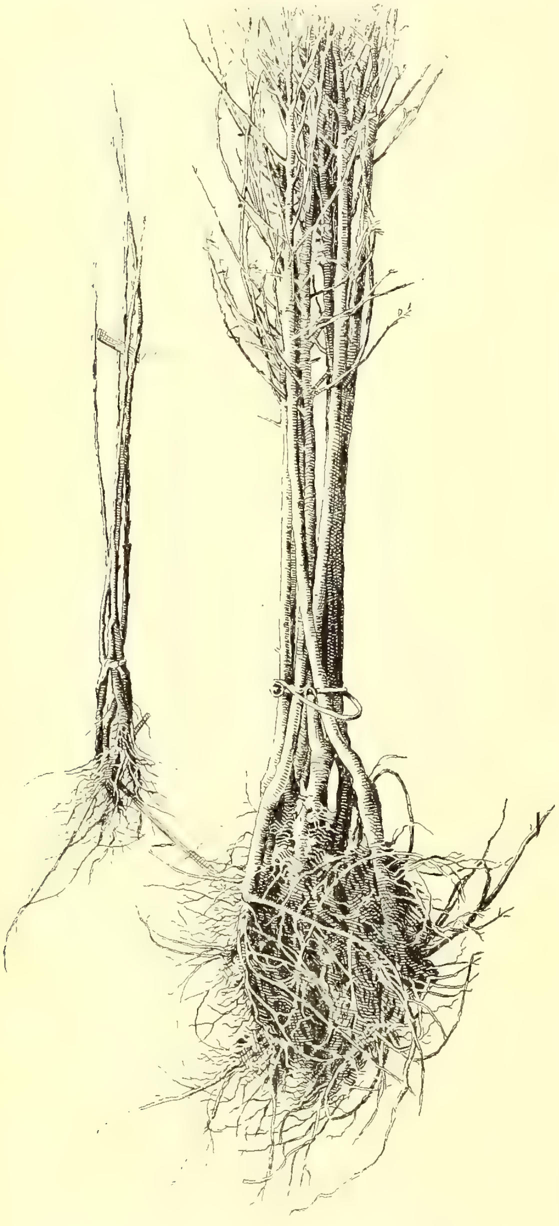


FIG. 3. TWO-YEAR-OLD PIECE-GRAFTS AND BUDS.

All the illustrations—from photographs—accompanying this essay show the characteristic differences of root formation between piece-rooted and whole-rooted trees. In piece-rooted stock the roots tend to run out horizontally and to make a few large and prongy roots; and there is also a decided tendency to one-sided root development. I have observed these peculiarities in both eastern and western trees. Whole-rooted trees possess a symmetrical and deep root system. I am aware that the root system varies with the variety, but in the same variety I have always noticed the above differences between piece-rooted and whole-rooted trees. The shallow root system appears to characterize crown-piece trees as well as piece-rooted trees, although my observation upon this point has been limited. Fig. 1 shows the root-system of a two-year-old budded apple tree on the left, and that of a three-year-old root-grafted tree on the right.

Upon first thought, it seems strange that piece-rooted trees should possess, as a rule, a different root system from others, but the explanation is not difficult to find. Roots rarely start equally from all sides of the end of a cutting, and those, upon any side, which get the first and best start are likely to maintain the advantage. Fig. 4—also from a photograph—shows the young roots upon two growing piece-rooted stocks. The roots in each case have started from one side of the cutting. In whole-rooted budded trees, the stock is not removed from the earth and the natural root system is not disturbed. In whole-rooted grafted trees the roots are usually trimmed at their tips, and from each severed tip a one-sided system is likely to form; but as there are often two or three original roots to the stock, the combined one-sided systems are apt to produce more or less symmetry, for the new roots usually push outwards from the axis of the tree. And there also remains the fact that, even if the grafted stock possesses but a single root, there is a greater length of it than in the piece-root, and more roots can start from it and it can give a better root system. But it would seem that even then the root system of the whole-rooted grafted tree must be more superficial than that of the whole-rooted budded tree; and one intelligent nurseryman says that such is the case, but I have not had the opportunity to observe it. The deep-rooted character of a tree is certainly lessened when the ends of the descending roots are cut off, for thereupon the roots begin to branch.

All the foregoing facts do not prove that piece-rooted trees are shorter lived or less hardy than whole-rooted trees, but they certainly indicate lines of definite investigation. The piece-root apparently serves an excellent and perhaps indispensable purpose in the northwest, where great hardiness is required, by allowing the use of a long cion, which may be set deep in order that roots may start from it. In this manner an own-rooted tree is secured, as the piece-root only serves as a temporary mother for a cutting. The cion represents a variety of known hardiness, while seedling stocks are variable, and there is probably only an occasional one which is hardy enough to endure very severe climates. In the east, piece or root-grafting is falling into disfavor.—L. H. BAILEY, *before Nurserymen's Association.*

IOWA FRUIT NOTES.

HYBRIDIZING THE WILD CRAB—HARDY BUDS AND BLOSSOMS.

HYBRIDIZING THE WILD CRAB.—I have read carefully the statements of A. W. Sias and Professor John Craig, in regard to the possible improvement of *Pyrus coronaria*. During the past five years I have given the subject some study, and it may be well to give briefly my present conclusions upon this important matter.

(1) It will be difficult, if not impossible, to secure fertile seeds. We have made a number of successful crosses, as was indicated by the fact that we varied the shape and markings of the fruit of the crab, but as yet we have not been able to germinate a single seed. The cross is a violent one, and so far the fruits have been seedless or, when apparently perfect, the seeds have failed to germinate with the best possible care, both in plant-house and the open air.

(2) We have no evidence that the Soulard crab named by Mr. Craig is a hybrid, or even a marked variation of the species. The *P. coronaria* in the west runs into many varieties, differing in size of tree, leaf, habit of growth, and in size, season and quality of fruit. During the past ten years I have seen many specimens from native groves, as large and good as the Soulard, or the supposed crosses of Mr. Patten and Mr. Fluke. So long as the peculiar core surrondings of the wild crab are retained, and the typical leaf and flower, I shall have no faith in supposed hybrids.

(3) If hybrids are produced—as is yet possible and probable—they will not be as rich in promise as is usually supposed. In the prairie states the native crab is not a truly hardy tree outside of its native haunts in the thickets. Exposed to wind, storm, and sun, in isolated positions in orchards, it is subject to blight, sunscald, and other troubles, which the Oldenburg, Anis, Hibernal, Silken Leaf and dozens of our cultivated apples wholly escape. At the far north, where the hardiness of a tree is fully tested, the crab apple is not found native, and when planted beside the true iron-clads it fails on account of winter injury.

(4) We already have Russian varieties of the apple that are hardier in every respect under culture than the wild crab, and have proved good bearers of large, handsome and good fruit that keeps through winter.

These conclusions are not given to discourage attempts to improve our native fruits, but to direct attention to the fact that our most promising field of work at present is the crossing of the hardiest and best of our late fall and winter Russian apples, with the pollen of such excellent sorts as Grimes' Golden, Jonathan, Fulton, Northern Spy, Osceola, etc. We already have young trees from such crosses that promise to be fully as hardy in tree as our native crab.

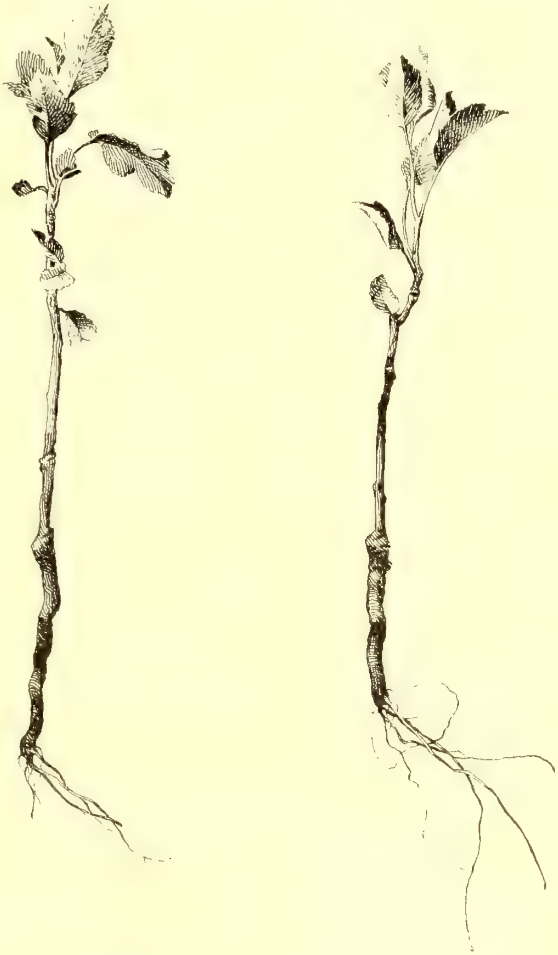


FIG. 4. ROOT-PRODUCTION ON PIECE-ROOTED STOCKS.

HARDY FRUIT BUDS AND BLOSSOMS.—Dr. Halsted's notes (May AMERICAN GARDEN) on the condition of peach buds in New Jersey are suggestive. We also were favored with Italian-like weather up to the last days of February, when it was followed by a number of days of very low temperature with dry westerly winds. The buds of our hardy peaches, of *Prunus Simoni*, *Prunus virgata*, the Japan plums, and other plants from less rigorous climes, were started, and utterly killed by the sudden change. Though the buds of *Prunus Maacki*, *Prunus triloba*, the common lilac, and other plants from Siberia, the valley of the Amur, and northwestern China, twere started still more, yet they came through the 25° below zero weather without apparent injury.

This seems to prove that even the unfolding buds of some hardy plants are capable of enduring extremes of temperature which will kill even the dormant fruit buds of the peach, and many other less hardy plants. Even when fully expanded, some of the plants of the Amur will endure a freeze that would destroy the half opened buds of even our native plums. As an instance: three years ago our plants of *Prunus Siberica*, or Russian apricot, were in full bloom the last of March, and were subjected to a frost that formed ice in a watering trough near them, nearly half an inch thick; yet not a flower was injured, and we grew hundreds of seedlings from the almonds that matured. In like manner, the foliage and nearly expanded fruit buds of *Prunus Maacki* have been severely frozen without show of injury, when the starting foliage and buds of even the native willows were blackened. This gives us a hint that we may yet secure varieties of the peach, almond, and possibly other fruits, from the home of *Prunus Maacki* and the Amur almond, which will endure a low temperature when the buds are started. In the last letter received from the lamented Charles Gibb, when in northwest China, he stated that peaches and apricots were really grown in Mongolia and the valley of the Amur, and that he would devise means for obtaining them.

To a great extent, the fruit trees and shrubs we have on trial from the interior provinces of Russia and north central Asia, are provided with very hardy fruit buds and blossoms. It has long been known that the half or fully expanded blossom of the Oldenburg apple would safely pass through frosts or bad weather that would ruin those of most of our fruits of west European origin, and we now find that dozens of varieties from its home on the Volga will endure as much and some even more.

The cherries, plums and pears of the interior steppe of Russia we find have equally hardy buds and blossoms. As an instance: in the spring of 1888 we had a very heavy frost, when our native plums, the Richmond cherry, and a number of the Russian cherries were in blossom or the buds nearly open. The native plums were nearly all ruined, and there were no Early Richmond or other common cherries grown in the state; yet some of our Russians were well loaded with fruit.

So far, it appears to me, too little attentfon has been given to the relative hardiness and perfection of the blossoms of our fruit trees and shrubs. Aside from the question of relative hardiness, close observation has shown that many of the cultivated varieties have defective blossoms. The Rogers' hybrid, and some other grapes, we find have little, if any, perfect pollen, and are barren unless intermingled with those possessing perfect flowers, and the same is true of some of our raspberries, plums and apples. Again, some of our plums and other fruits have apparently perfect blossoms, yet they fail in our climate to be self-fertilizing, as the pollen is ripened and wasted before the stigma is ready to receive it. I hope that able observers and experimenters will give more attention to the subject than has been given in the past.

The past unusual winter gave us a good opportunity for the selection of trees and plants that winter well. While many of the half-hardy and really hardy plants were well started when the cold wave struck us, we found dozens of our native trees and shrubs, and dozens of varieties of apples, pears, cherries, plums, and all other trees and shrubs from east Europe and north central Asia, with buds as perfectly dormant as they were in November. As a rule, these are the truly hardy trees in wood, bud and blossom; yet, as stated, many plants that hibernate less perfectly than the peach, we must still retain in our hardy list as exceptions to a general rule.

Iowa Agricultural College. J. L. BUDD.

HOME-MADE CIDER-VINEGAR.

The wholesale adulteration of commercial vinegar makes it important that everyone who grows apples should manufacture a good quality of cider-vinegar for home use, and for the local market. We doubt if there is much money to be made by the general apple grower in manufacturing vinegar upon a large scale, but a small quantity is often salable and profitable. We have frequent inquiries concerning the best methods of making vinegar, in reply to which we publish the following instructions from L. R. Bryant, of Princeton, Illinois. Secretary of the Cider and Cider-Vinegar Makers' Association of the northwest, and which appeared in a late number of the *Prairie Farmer*.

The essentials for making cider-vinegar on a small scale are a grinder to grate up the apples into a fine pulp, a good press to extract the juice, barrels to put the juice in, a frost-proof room or cellar to store the product in, and, of course, a good supply of decent apples.

I would not advise, under any circumstances, the use of the little hand-mills that are scattered all over the country. They grind the apples so coarse and the presses have so little power that not much over one-half the juice is obtained. The cider is not clear, but full of pomace; and altogether it is a slow, hard way to make cider with them. If the work will warrant it, buy a grater which can be run by power, and a medium sized press which can be worked by hand. This machinery can be obtained of concerns which make the building of cider machinery a specialty. If the business does not warrant getting such an outfit, have the cider made at a good custom mill. Any plan of extracting the juice from the pomace by leaching, without pressing, will probably result in failure.

Ordinary good wind-falls will make good material for vinegar, but care should be taken to reject all immature, wilted, and rotten apples. The better the apples the better the product. When the cider is made, it should be put into good iron-bound barrels and ranked up out of doors, but in the shade, and allowed to ferment. The barrels should be placed on timbers or poles elevated from the ground sufficiently to allow the contents to be run off into other barrels. It is a great convenience to have a tank to put the cider in as it runs from the press. This will make the vinegar stock of more even strength and give it a chance to settle.

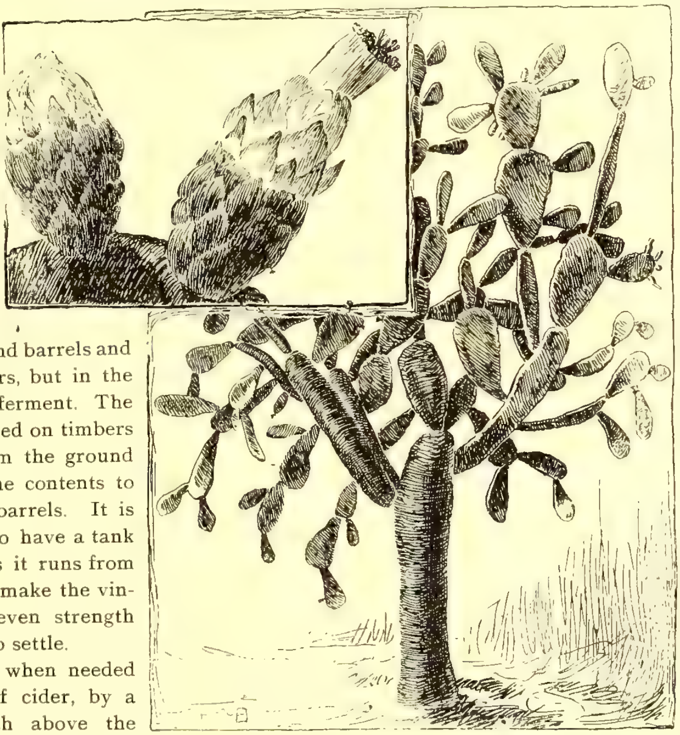


FIG. B. NOPALEA COCCINELLIFERA.

Draw off the tank when needed for a fresh supply of cider, by a faucet placed an inch above the bottom of the tank. The barrels in this case should not be filled more than three-fourths full and may be put at once into the cellar or other place of storage; but it is preferable, if early in the season, to rank up out of doors, as before directed, until cold weather.

On the approach of freezing weather, rack off the vinegar-stock into clean barrels (only three-fourths filled) by means of a faucet placed in the end of the barrel, or preferably with a syphon made of five-eighths rubber tubing. This should be raised an inch above the bottom of the barrel to avoid drawing off the sediment. All settlings should be put into a separate barrel. The barrels can now be ranked up in their winter quarters, the bungs taken out and remain undisturbed until the contents become good vinegar, provided they are kept in a furnace-heated cellar or other artificially heated room.

An ordinary cellar is too cool to make vinegar quickly, and if such a place is used for winter storage, the barrels can be removed to a common shed on the approach of warm weather, remembering always to rack off the contents before a barrel is moved. Never put barrels in the sun in hot weather, as they will be spoiled and the contents lost. When the vinegar is thoroughly made, a cool, dry cellar is an excellent place to store it, and the barrels may be filled and bunged up.

In many cider-mills the pomace is pressed once, then re-ground, or picked to pieces, and pressed again, and the product used for vinegar. If water is added to this repressing it should only be *sprinkled*. The pomace can then be used, while fresh, for feeding stock of all kinds; but care should be taken at the commencement, and it should always be given in rations, the same as grain.

I have said nothing about the theory of vinegar-making, nor have I described vinegar-generators and expensive apparatus, as it has been the purpose of this article to tell how to make good vinegar on a small scale. No one, of course, will expect to go into the vinegar business extensively without posting up thoroughly.

Until recently but little attention has been paid to the purity and quality of the vinegar used by the mass of consumers. So that it had a sharp "tang" it was all right; but now this is slowly changing in many localities, and the strength and quality of vinegar are prescribed by law in some States.

In conclusion, I will call special attention to these points: To make good cider or vinegar, use good, clean apples; exposure to heat and air is what makes vinegar; to have bright, clear vinegar free from must, rack it before moving it, if it has been standing any length of time; and thoroughly clean the barrels as soon as emptied. Good vinegar cannot be made out of a large quantity of water and a little cider. Strong, late-made cider *may* bear the addition of a little water; but that made early in the season will not. Hard cider is not vinegar, and no attempt should be made to dispose of any vinegar until it is clear and thoroughly made. Cheap instruments for testing the comparative strength of vinegar can be had, and should be used by every one who expects to market vinegar.

If all this seems to be too much trouble and expense, the manufacture of vinegar had better not be attempted, but the apples sold to some one in the business regularly. Poorly made cider-vinegar not only injures the reputation of the maker, but hurts the sale of all cider-vinegar; it cannot prove really profitable to anyone connected with it.

PRUNING FRUIT TREES.

PROFESSOR BAILEY'S article on peach culture, with particular reference to Michigan practices (March American Garden), is a practical one, and is good enough, with some modifications, for all this great country of ours. There is no point in horticulture that I have given so close attention since I came to California as the proper shape and pruning of the peach tree.

The system practiced here by the very best growers is very similar to that which Professor Bailey says is best in Michigan. We call it the wine-glass or vase-form here in California. About the only difference in the two systems is that here in our superlatively rich soils and long growing season we are forced to cut back quite severely each winter for the first five years, which is done mainly to keep the young tree in shape and within bounds, and to strengthen the base of the main branches. Some genuine experts in peach growing even recommend midsummer cutting back in the extra deep, rich soils of the hot interior valleys, and I am inclined to think the practice is right.

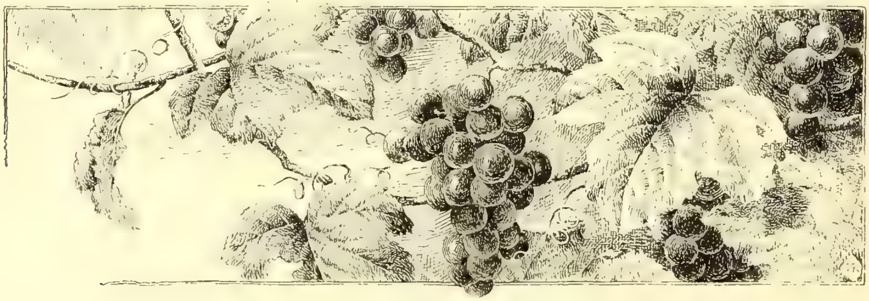
The illustrations of trees in the model Michigan orchards are very nearly perfect for California, except that the trees are too tall, and there are not twigs and foliage enough near the base of the main branches. This last is a most serious fault. This is a fault in Michigan, and would be ten times as faulty in this hot, dry climate of California. Such branches should be clothed with spurs and leaves from the main bifurcations up. This cannot be had unless the uppermost sprays of the trees are kept constantly thinned out. The large tree at the right, on page 131, has something of this, but not nearly enough. In that picture generally there is too great a stretch of bare branches, and they are too high.

About Petaluma, Sonoma county, California, one can see the most disastrous training of the peach—many trees eight and nine feet to the first green leaf, and the same is true all over California. But our expert fruit-growers do not grow such trees, especially peach trees. They are careful in forming, shaping, pruning and thinning them, and they are the men who get the coin from their trees.

In my mind's eye, the model peach orchard would be that in which the trees were twelve feet apart each way, and the trees never allowed to reach more than eight feet in height and seven feet in greatest diameter of top, with heads branching out within six to twelve inches of the ground; and then every inch of them should be clothed with foliage and fruit to their summits. They should be cultivated, fertilized (if they need it; here they generally do not), thinned and pruned on the most radical intensive system. Such a model orchard should be as thrifty, vigorous and fruitful when thirty or forty or more years old as it was at five years. But a peach or any other fruit tree cannot grow good fruit for any length of time, if fruit and foliage are crowded together at the extreme end of a branch without any foliage for six or nine feet; nor can the little bunch of crowded foliage on the end of such branches supply the necessary strength of branch, stem and root sufficient to keep up vigor and strength.

Why will not the same system which I have given for the peach apply to the apple and other fruits and give equally desirable results? I think that it will, with some unimportant modifications to suit the species. Apple trees in the prairie states are in every way the best when trained with low heads, and then given no pruning whatever for the first fifteen years in orchard.

Sonoma County, California. D. B. Wier.



CACTUSES IN-DOORS AND OUT.

WHAT IS A CACTUS?—THEIR DISTRIBUTION AND COUNTERFEITS—THEIR USES AND CLASSIFICATION.

IT IS always difficult to define a family of plants. Nature never consents to be buttoned up in a straight-jacket. Limits of groups are always flexible and indefinite, and nowhere more so, perhaps, than in the cacti. To most people a cactus is a curious plant—short and thick in stature, leafless and fleshy, deeply furrowed and beset with spines, but such features are not peculiar to these plants. There are many other plants to which they are common. To be sure, most of the cactuses possess these characteristics, but some of them are tall and slender, some have cylindrical and plain stems, some have true leaves, and many of them are spineless and smooth. Even the botanist finds difficulty in clearly defining them. He is obliged to disregard their forms and other general peculiarities, which are so apparent to common observers. The definitive characteristics of the family reside almost entirely in the flowers and fruit, and they may be stated in a rather loose way as follows:

The flowers are solitary and sessile; the sepals and petals are much alike, yet numerous and distinct from each other, and they imbricate or overlap in several rows, and their bases are adherent to a one-celled ovary. The stamens are numerous, with long filaments, and they are inserted on the tube of the flower. The style is always single and the stigmas are many. The fruit is a more or less fleshy berry.

In shape the cactuses are perhaps the most various of all plants. Some are almost perfectly spherical, some are curiously flattened, some are angled, furrowed and grooved; many of them are column-like, and some are composed of curiously flattened joints, like an aggregation of a great many plates or thickened leaves one upon the other. The surfaces present the most surprising conformations, ranging all the way from perfectly plain rinds to those deeply furrowed, as in *Echinocactus Visnaga* (Fig. *G*), those composed of laminated or plate-like parts, as in the anhaloniums (Fig. *N*), or again to those presenting an exterior of curious polyhedrons, as in the six-sided echinocactus, *E. hexædrophorus* (Fig. *H*).

In size they are equally various. Some are mere balls, which may be covered by the foot, while others rise in post-like trees to the height of 50 or 60 feet, with curiously elbowed branches like huge candelabra. Fig. *A* (page 451) represents a typical "cactus forest" of our southwestern deserts. Some of the low species attain great size. A specimen of *Echinocactus Visnaga* (Fig. *G*), which weighed a ton and measured over nine feet in circumference, was transported alive to England, in 1846, from Mexico.

For the most part cactuses are leafless, yet the pereskias (Fig. *J*) have true leaves; but in a certain sense the whole plant may be said to be one gigantic and curious leaf, for the green tissue of the entire surface acts in the capacity of foliage. The cactuses are inhabitants of exceedingly dry and hot regions, where evaporation from many leaves would be sure to destroy the plant. They have therefore through the evolution of ages taken on the form which presents the least possible surface to the air, and the moisture which fills their inner cavities is wonderfully protected from the dry atmosphere about

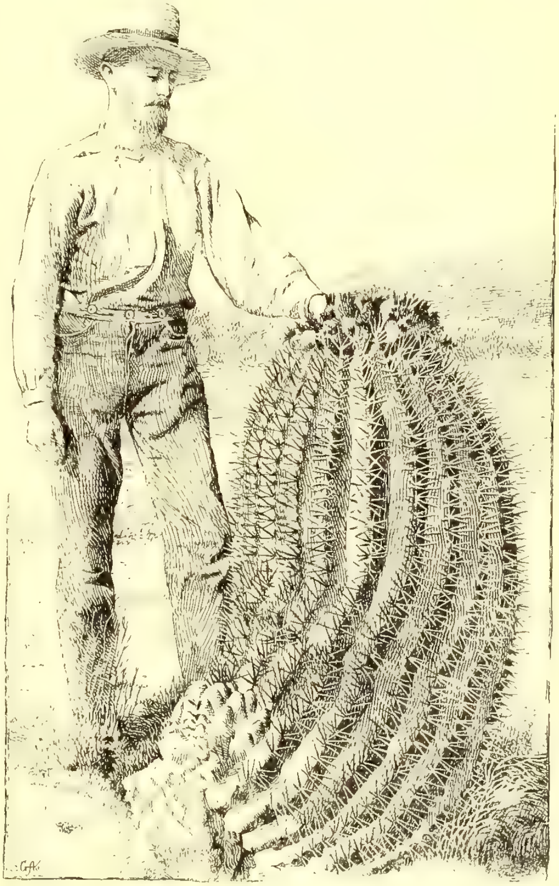


FIG. D. ECHINOCACTUS EMORYI.

them. They are also covered with a very hard epidermis, which serves the same purpose of preventing evaporation, and most of the species are clothed with numerous spines and hairs which also check the loss of moisture. These spines and hairs are nearly always characteristic of desert plants. Some have supposed that one of their chief functions is to protect the plant, for any animal which frequents desert regions would be very greedy of any plant which contains much moisture. Yet not all of cactuses have spines. There are some species even in arid regions which are perfectly smooth, but in such cases the epidermis is probably thick enough to sufficiently check evaporation. Cactuses might be called vegetable jugs.

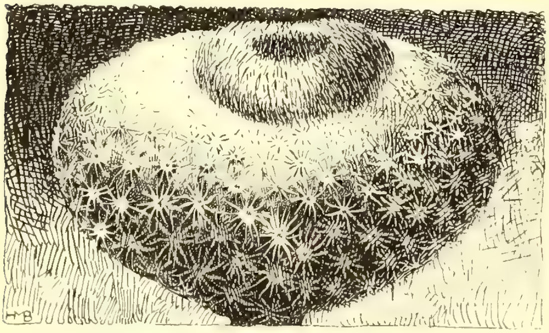


FIG. E. MAMILLARIA MICROMERIS.

The armament of the cactuses is itself exceedingly various. It is oftenest made up of sharp and stiff spines. These vary in kind and number and manner of insertion. The number borne upon a tubercle is usually characteristic of the species. Two mamillarias show these differences. *M. micromeris* (Fig. *E*), *i. e.*, "small parts," has from 20 to 40 small spines upon each tubercle, while *M. macromeris* (Fig. *F*), "large parts," has only about half the number and they are very large and strong. *M. macromeris* is one of the largest flowered of all mamillarias. In fact, the flower is almost equal in size to the body of the plant. The covering of the old-man cactus (*Cereus* or *Pilocereus senilis*, Fig. *CC*) is mostly composed of long and white hair-like locks, while some species, particularly the opuntias, possess many small prickles which are detached by the touch and quickly enter the flesh. An old-man cactus was once estimated to bear 72,000 bristles, and upon a certain echinocactus they were reckoned at 51,000.

The flowers of the cactus tribe are always singular and interesting, perhaps the more so because they are so entirely unlike in expression to the plants upon which they are borne. If the plants remind one of the most scorching deserts, the flowers, on the other hand, recall the choicest blossoms of the conservatory and the garden. They are exceedingly varied in form and color and size. The blossoms of the night-blooming cereus and the phyllocacti are among the most attractive and showy of flowers, while those of the rhipsalis are often inconspicuous. Yet this showy characteristic of the cereus flowers is by no means common to even the cereus tribe. The flowers of some of the species are small and almost green. Fig. *Q*, *Cereus chloranthus*, represents a species which has yellowish-green flowers, and their diminutive size can be understood when it is known that the entire plant rarely exceeds ten inches in height. This figure should be compared with Fig. *A*, which shows plants of the same genus, and with *S*, one of the night-blooming cereuses of the gardens. These dissimilarities are but a few of the surprises which abound in this singular family, and which render it extremely attractive to the student of nature's wondrous and never-ceasing diversity and beauty.

The cactuses are peculiarly American plants. There is but one of the thousand described species which is indigenous to other countries, and that one is so unlike ordinary cacti that one would scarcely think of associating it with them. This plant is a rhipsalis, closely allied to the mistletoe cactus of greenhouses. The home of the cactus family is in the deserts of the southwestern United States and Mexico and the Andean region of South America. They appear to have been developed through long ages to suit the peculiar climates of those regions. In other desert regions there are plants which are similar in form and yet very different in botanical character. This is particularly true of the great desert region of southern Africa, which is inhabited by many plants so nearly like the cactuses as to be mistaken for them by the ordinary observer, but which belong to an entirely different division of the vegetable kingdom. These cactus-form plants are euphorbias, many species of which

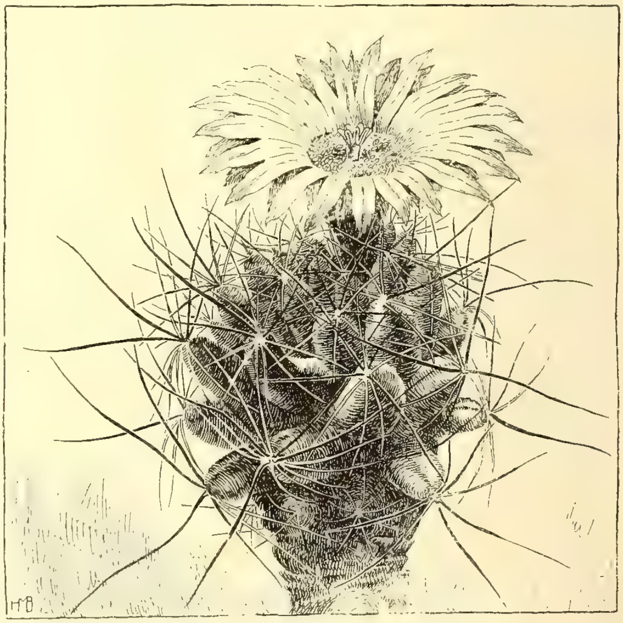


FIG. F. MAMILLARIA MACROMERIS.

inhabit this country, but which attain a fleshy character only in desert regions. The euphorbias are to southern Africa much what the cacti are to Arizona and Mexico. Fig. *K* represents one of these cactus-form plants, and one which is often seen in houses, *Euphorbia meloformis*, or melon-like euphorbia. Even the common *Euphorbia splendens*, grown everywhere, is often mistaken for a cactus. But this confusion of fleshy and spiny plants with cactuses is general. Aloes, agaves, house-leeks and yuccas are often mistaken for them. And in fact some of these very plants dispute with cactuses the possession of the deserts. In our southwestern regions the yuccas rise to tree-like stature, with thickened and hardened stems, and many other plants, notably the agaves, take on somewhat similar characters. All this only illustrates the type of vegetation which desert regions demand. Characteristic American desert landscapes are shown in Figs. *A* (p. 451), *P* (p. 468) and *PP* (p. 469).

It will be necessary to go somewhat into detail in the geographical distribution of these and a few similar plants, in order to understand more perfectly their relationships and characteristics. All this bears directly upon cultivation, for it not only enables us to understand their requirements better, but it affords us an inexhaustible source of pleasure as a mere matter of knowledge. Our interest in cultivating plants is due quite as much to a general knowledge of their habits and characteristics as to the beauty of their forms or flowers.

In the northeastern United States there are very few cactuses. There are only four which grow wild east of the Mississippi and north of Virginia, and these all belong to the Indian fig genus or opuntia. *Opuntia Rafinesquii* (Fig. *I*) extends farthest north. It is not infrequent upon sandy plains in Michigan, Wisconsin and Minnesota, and it extends southward to Florida, and it reaches northward along the coast to Massachusetts. It is a neat and attractive species,, well worth cultivating. In Dakota there are two wild species of another genus, mamillaria. Upon the distribution of cacti in the United States, the late Dr. Engelmann wrote, in 1856, as follows:

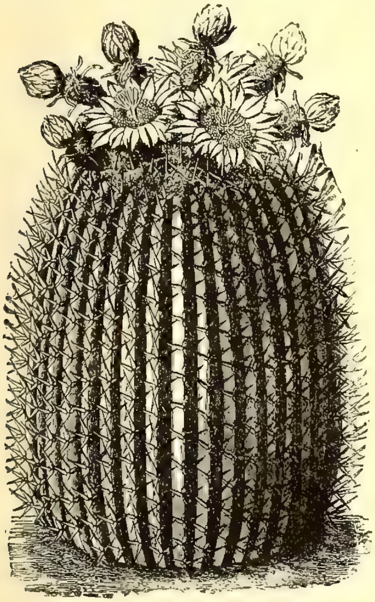


FIG. G. ECHINOCACTUS VISNAGA.

"As to the geographical distribution of the cactaceæ, our territory may properly be divided into eight regions, namely:

"1. *The Atlantic Region*, which has only a single opuntia, and that peculiar to it. Along the southern coast some West Indian species may yet be expected.

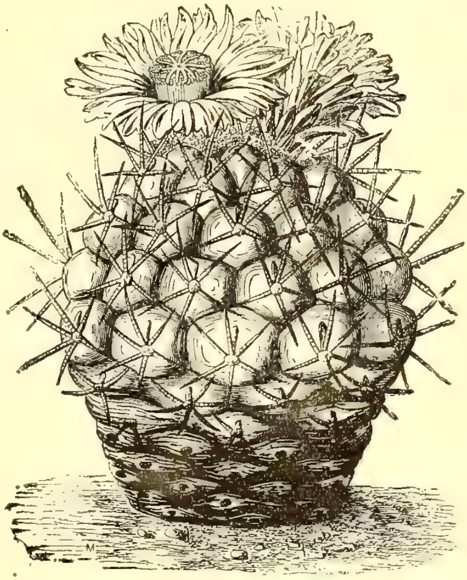


FIG. H. ECHINOCACTUS HEXÆDROPHORUS.

"2. *The Mississippi Region*, including the Western States, produces another opuntia, which, in different distinct forms, extends into the third, fourth and fifth regions.

"3. *The Missouri Region*, namely, the northwestern or upper Missouri territory to the Rocky mountains. It furnishes two mamillarias, both extending into the fourth and fifth regions; and three opuntias, one of which only is peculiar to it.

"4. *The Texan Region*, namely, the eastern and inhabited parts of Texas, westward to the San Pedro, and northward including the territory south of the Arkansas river. This region produces five mamillarias, two of them peculiar to this district; three echinocacti, none of which are found in any other of our regions; six cerei, all of them peculiar to this district, and six opuntias, of which only three are restricted to it, and among them is only a single cylindric opuntia. This region contains therefore altogether twenty species, fourteen of which are peculiar to it.

"5. *The New Mexican Region*, namely, western, uninhabited mountainous Texas, and eastern New Mexico to the eastern headwaters of the Colorado of California. This region is our richest cactus district. It has furnished sixty-five species, fifty-five of which are peculiar to it, namely: nineteen mamillarias, of which sixteen are peculiar; nine echinocacti, all of them belonging to this district only; sixteen cerei, fourteen of which are peculiar, and one common also to other regions; and twenty-two opuntias; of these last twelve are flat jointed, four clavate, and five cylindrical ones; seventeen of these species are peculiar.

"6. *The Gila Region*, comprising the whole valley of the Colorado south of latitude 36° and the country of the Gila, its large southern tributary. This has thus far furnished thirty-six cactaceæ, namely, five mamillarias, three of them peculiar species; six echinocacti, none of them found elsewhere; seven cerei, representatives of each of our four sub-genera, and five of them peculiar; eighteen opuntias, of which six (all peculiar) belong to the flat kinds, two to the clavate and ten to the cylindric division; one of the former and nine of the latter are peculiar.

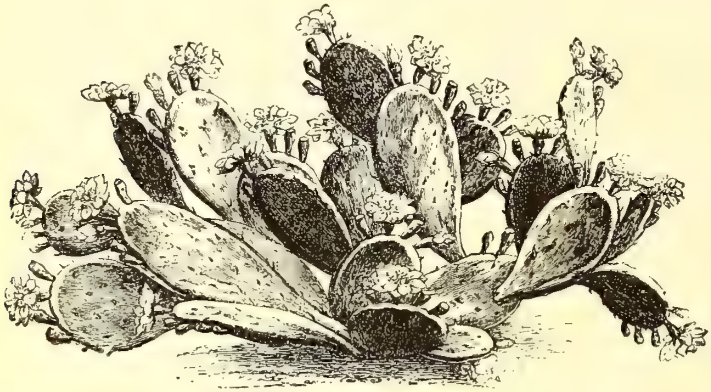


Fig. I. Opuntia Rafinesquii.

"7. *The California Region*, namely, California west of the Sierra Nevada, and comprising the southwestern part of the present state of California, produces six cactaceæ, five of which are peculiar. They are one mamillaria, one echinocactus, one cereus and three opuntias.

"8. *The Northwestern Region*, comprising the northern parts of the state of California, the territories of Utah, Oregon and Washington. This region has so far furnished only a single opuntia (from eastern Oregon), common also to the Missouri region."

Later researches have increased the number of species, but their relative distribution remains about the same.

The more general distribution of cactuses is well told by Grisebach in his *Vegetation der Erde*: "The dry climates of America are most sharply distinguished from similar places in other parts of the world by their cacti. These comprise a large and distinct family, native only to America. Cactuses reach their greatest perfection in the tropical zone, upon the rocky plains of Mexico and upon the Andes of South America. In the Colorado region, they shrink during the winter from loss of sap and assume a red color, as if a continual period of growth were a necessity which they cannot easily satisfy. The southern prairies have as great a variety of peculiar forms as the tropics, and all the principal forms of the family are found there. But northward the number of species rapidly diminish, the large and massy ones are wanting, and beyond the Missouri, at Rainy Lake (49°), there only remains one species, *Opuntia Missouriensis*. This species here marks the extreme limit of this type of vegetation. In the region of the Missouri this species is very common, being one of the characteristic features of these prairies, and the more so as no cactus forms are found in the North American woods.

"The succulent forms which unite the Mexican flora with that of the southern prairies often forms, upon the highlands of Mexico, the most abundant and characteristic product of the dry and rocky soils. Nearly all the cacti found in our greenhouses come from Mexico. There they are found in nearly all parts of the country; a few mamillarias grow at an elevation of 11,000 feet. Only the phyllocactus, which is never found upon the prairies, and whose stem has the flattened form of a leaf, is limited to the shady woods of the hot regions.

"Upon the cliffs of the West Indies the cereus is found in great profusion, being over twenty feet high. It was once thought that these had been carried from the continent, but a more careful examination proved

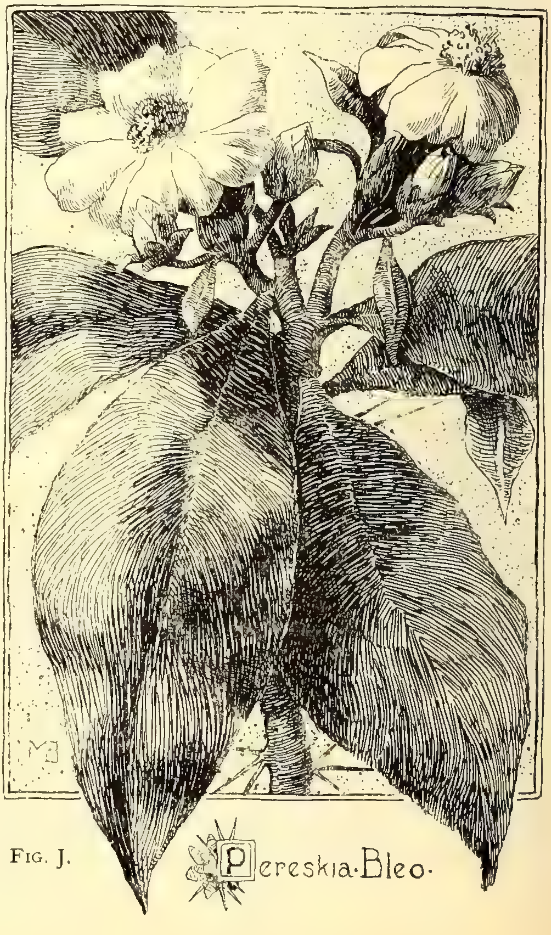


Fig. J.

that they are endemic, and therefore to be considered as belonging to the natural vegetation of these islands.

"In South America, north of the equator, as in Mexico, the cactus is an indication of extreme heat and drouth. No cactuses are found on the bay Choco, but on the coast of Venezuela they are sometimes the predominating form of vegetation. On the seashore of La Guayra, they consist of branched cereuses and opuntias; from the hot cliffs spring the melocactus, while the mamillarias seek the shady places. So here the cacti extend from the sea level to an elevation of 2,000 feet, where the forests begin.

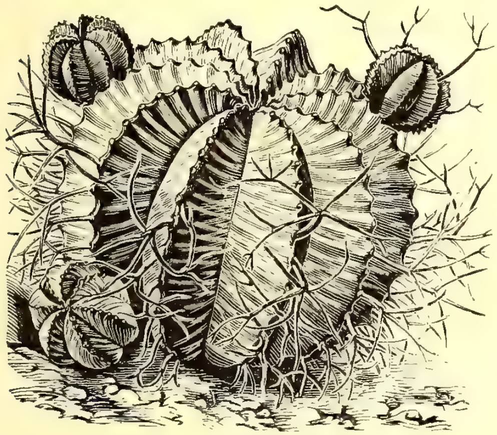


FIG. K. EUPHORBIA MELOFORMIS.

"In no part of Brazil are the cactuses, the branched pillars of the cereus and the flat-stemmed opuntia, so numerous as in the plateaus. They also flourish well upon the light soil of the open woods. The Brazilian forms of cacti are closely related to those of Venezuela and Mexico.

"They are also very abundant in the Andes, being found westward from the eastern ridge, and are especially numerous in the highlands of the Pacific slope. They form the most important connection between the flora of the Mexican and Peruvian Andes. On parts of the pampas the cactus forms nearly the only covering of the soil. The pampas seem generally to be too moist for the cactus, but on the Chamarsteppe they are found both in the bush and in the forest. They also appear along the Parana, where the clay soil dries out. Here grows one of the largest species, a pillar-cactus, attaining a height of from 20 to 30 feet. On the steppe of Cordove a large opuntia is found, having white thorns 6 to 9 inches in length. Twelve smaller species have been distinguished near Mendoza; among these, cereus, opuntia, mamillaria, in their different forms. As in the prairies, these forms are found in the higher latitudes, but their number constantly diminishes. In Patagonia only the *Opuntia Darwinii* is found, in the same manner as in Missouri. In the Andes mountains, from Santiago to Mendoza, there are found several species of melocactus and opuntia, growing at an elevation of 12,000 feet. They are covered with a woolly material, and are quite small."

The distribution of the cactus-form euphorbias is epitomized as follows by the same author:

"The fleshy euphorbias in the Old World take the place of the cactuses in New World. In the Sahara they are not very abundant, as their African center is in the Cape region. A Nubian euphorbia, *E. candelabrum*, grows to a height of 30 feet, spreading its branches far apart. Euphorbias are also found in the Kalahari desert, which contains many of the forms found in the Sahara. Upon the barren, rocky soil of the Karroo-steppe, in the Cape region, all sizes of cactus-like euphorbias may be found, while the naked forms grow abundantly around Algoa Bay.

"Only one form of euphorbia is said to appear in Australia, where it grows on the steppes of Spencer's Gulf.

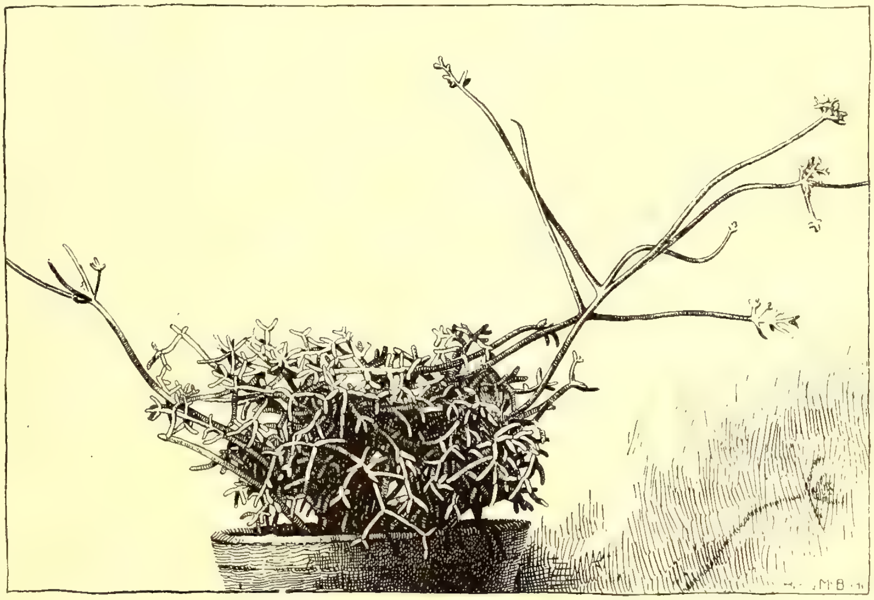


FIG. L. RHIPSALIS SALICORNOIDES.

"In the Canary Islands the euphorbias are found growing at a height of 1,500 feet on the north side and 2,500 feet on the south side of Mt. Teneriffe. The cactus-like euphorbias are very abundant; and the leaf-bearing kinds, *E. balsamifera* and *E. Regis-Jubæ*, are also prominent among the other endemic forms.

"Many of the euphorbias of the Oceanic Islands resemble those of the Soudan, thus forming a connecting link between the vegetation of these islands and Africa."

All this stretch of vision leads us to the still broader ambition to know what are the general peculiarities of xerophilous or desert plants and regions. And here we can do no better than to quote Baker in his inimitable sketch of *Botanical Geography*, omitting some of the examples:

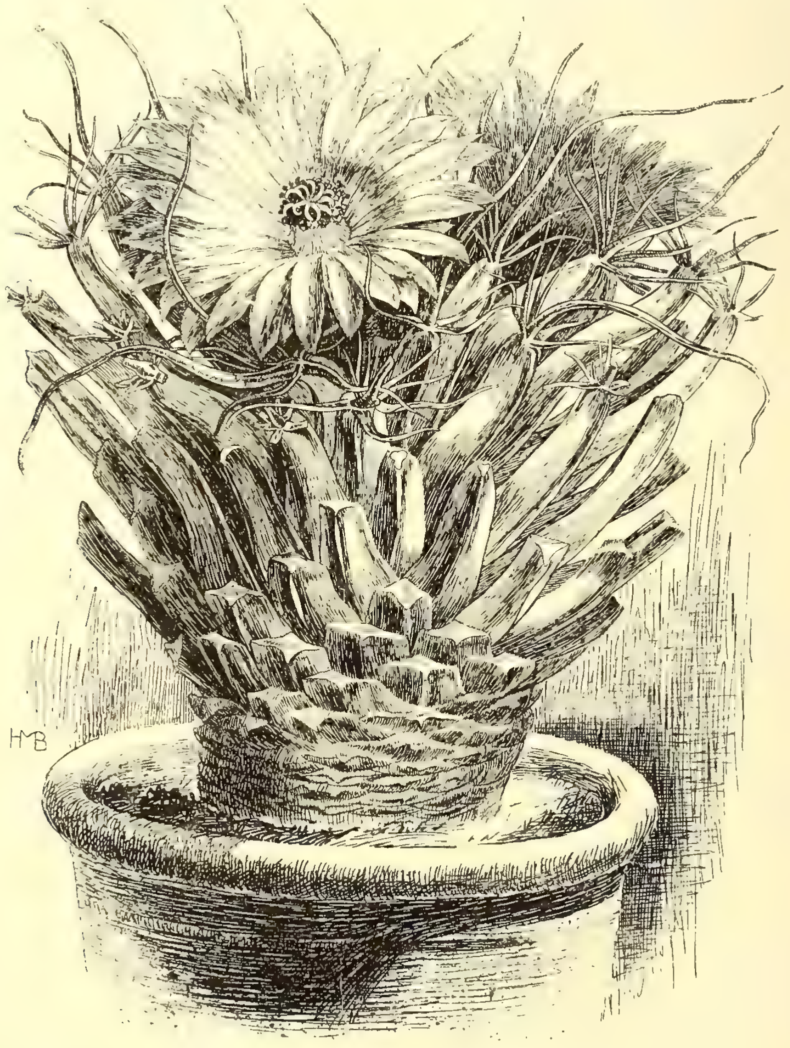


Fig. O. Leuchtenbergia principis.

"Broadly stated, the grand influence which the distribution of moisture over the earth's surface exercises upon the distribution of plants is that the earth is girdled round, in and near the borders of the two rainless zones, which run like a belt round the earth near the two tropics, and separate the region of the periodic rains from the region of irregular rains by two broad belts of country, in which the xerophilous plants predominate more decidedly than they do in any other part of the world, and that they run out from these belts into the interior of the continents, both towards the equator and the poles, avoiding the insular climates.

"The concomitants in plant-form of the xerophilous type of constitution are as follows: In dicotyledons (or netted-leaved plants)—1st, leaves becoming thick and fleshy, with pulpy inner and leathery outer layers, in which the air passages and stomata are few, and the cells either small or their walls thickened by secondary deposits of cellulose, as shown in mesembryanthemum, sedum, cotyledon and sempervivum; 2nd, the stem condensed into a single central, unbranched, barrel-shaped or top-shaped mass, which is either leafless, and armed only with spines, as in mamillaria, echinocactus and various euphorbias, or without spines, and bearing fleshy or rigid leaves, as in cycads, welwitschia and *Vitis Bainesii* and *V. macropus;* 3rd, branching, fleshy, or hard stem types, without proper leaves, but in which the main stems or petioles put on a leafy appearance, as in opuntia, phyllocactus and the phyllodineous acacias;* 4th, much branching shrubs, with copious whip-like branches without either leaves or prickles, as rhipsalis, cassytha, and *Euphorbia Tirucalli;* 5th, much branched wiry herbs or shrubs, with an excessive development of prickles, as gum acacias; 6th, shrubs with small, hard, rigid leaves, as in the proteaceæ and epacris; 7th, leaves, and often also branches, gland-dotted, as myrtaceæ, rutaceæ and psoralea, or yielding gummy exudations, like myrrh and frankincense; 8th, flowers protected by an excessive development of scariose bracts, as in helichrysum and gomphrena; 9th, dense hairiness or scurfiness on the leaf, bract, and other foliar organs; 10th, in the development of a tuberous root, large out of all ordinary proportion in comparison with the stems and leaves that come from it.

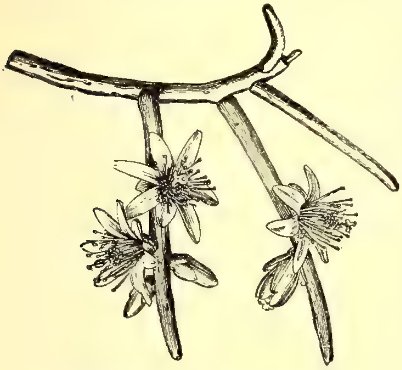


FIG. M. RHIPSALIS FUNALIS.

"In monocotyledons (or parallel-veined plants) we have the xerophilous type represented in two very characteristic forms; the large, thick, fleshy-leaved type, as illustrated by aloe, gasteria, haworthia, fourcroya, agave and bulbine; and the familiar bulb type, to which so many of our most beautiful open air garden flowers belong—lilies, tulips, hyacinths, daffodils, crocusses, colchicums, ixias—plants which mostly inhabit, not the heart of the rainless tract, but its borders, where rain comes but seldom and sparingly, and which push up into the leaf and the flower in the brief season of fertility, and spend the rest of the year in the form of an underground mass of dry or fleshy leaf-scales, in axils of some of which new plants are formed by a process of vegetative reproduction which enables them to hold their ground even if no seed be ripened.

"One of the most remarkable points about these xerophilous plants is the extraordinary way in which many familiar groups of plants, which are distributed through different climates, are modified in form in the xerophilous belts. We have an excellent instance of this in euphorbia, which is a genus of 700 species, spread over all parts of the world, all the members of which coincide in the extremely peculiar structure of the flower. About 600 of the species are annual or perennial herbs, several of them widely-spread garden and cornfield weeds, with slender unarmed stems, and a copious development of scattered, entirely sessile, simple leaves. About a hundred species inhabit the specially xerophilous region, and these, whilst retaining absolutely their floral structure, become so extremely modified in habit that they are usually taken for cactuses by inexperienced visitors to our living collections.

"The large floras of decidedly xerophilous type are five in number; two in the northern and three in the southern hemisphere, and are as follows:

"1st. The desert flora, extending from the Canaries, through the Sahara, and through Egypt and Arabia to the Indus delta. This is not so rich in large groups and large genera of decidedly xerophilous type as some of the others, but it is the largest arid tract in the world, and has a great many endemic genera and species.

"2nd. The flora of southern California, New Mexico, Texas and north Mexico, running out northward to Utah and Kansas, but stopped in a southern direction by the Mexican Andes. This is the exclusive home of agave and its allies, fourcroya and beschorneria, and of the rigid-leaved tree liliaceæ, yucca, hesperalœ, dasylirion and beaucarnea, and it is the great center of the cactuses.

"Turning now to the southern hemisphere, we have:

"3rd. The flora of southern Angola, stretching down the coast to the mouth of the Orange river, and across the Kalihari desert and Cape Karroo to Kaffirland. This is the great home of aloe (of which one large arborescent species is said to reach 150 feet in the spread of its branches), gasteria, haworthia, stapelia, mesembryanthemum (of which latter genus alone there are said to be not less than 400 species of extremely varied habit), and of the cactus-like euphorbias. This is the richest xerophilous flora in the world.

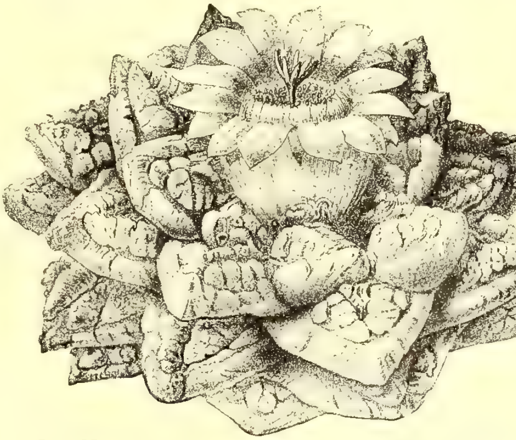


FIG. N. MAMILLARIA (ANHALONIUM) FISSURATA.

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*Many of the acacias do not possess true leaves, but the petioles or leaf-stalks are flattened and leaf-like. These petiole-leaves are called phyllodia. Most of our greenhouse acacias are phyllodineous.—ED.

"4th. The flora of Central Australia, including the Swan river territory, and reaching on the north to the tropic, and on the south to the Victorian Alps. Here there are no cactuses, stapelias, agaves nor aloes, and crassulaceæ is only represented by bryophyllum. The fleshy-leaved dicotyledons are represented by zygophyllum, calandrinia, two or three species of mesembryanthemum, and several chenopodiaceæ; and the fleshy endogens by bulbine. There are not less than 270 species of acacia.

"5th. The flora of the Chilian province of Atacama, which extends on the west side of the Andes from the borders of Bolivia to 28° to 30° south latitude, and in the heart of the continent of Catamarca, Tucuman, Cordova, Mendoza, and other provinces of the Argentine Confederation. Here there are no agaves, aloes or stapelias, and scarcely any crassulaceæ, but a great many cactuses and the cactus-like euphorbia are represented by one, and mesembryanthemums by two or three species."

Cactuses have many uses aside from their beauty and curiousness. Very many of the species produce edible fruits, and the time will undoubtedly come when some of them will be grown for their fruits. The natives in the cactus regions lay great store upon the fruits of some species. The great *Cereus giganteus* produces an edible fruit which the natives gather by the use of long poles. The fruit of *Cereus Greggii* is shown in Fig. *W*. This fruit attains a length of an inch and a half, and is edible. The edible fruits of various opuntias, particularly of the Indian Fig (*Opuntia Ficus-Indica*, Fig. *R*, page 471) are well known. Most of them are known as prickly pears, from their pyriform shape C. R. Orcutt, a California naturalist, writes recently to *Garden and Forest* that the manufacture of syrup from the fruit of the opuntia may at no far distant day become an important industry in southern California. *Opuntia Ficus-Indica*, or Indian Fig, *O. Tuna* (Fig. *T*), and *O. Tuna-manse* have become naturalized around the old Californian missions. They are natives of Mexico and make rank and rapid growth. The juice of the fruit which these plants produce in great abundance may be extracted in a cider press like the juice from apples, and boiled down to a fruity syrup indistinguishable from that manufactured from the watermelon. Excellent vinegar may also be made from the juice. In Mexico these cactuses are extensively cultivated for their fruit."

Some of the opuntias have long been used for hedges, particularly the Tuna. But the most important use of cactus plants is in the growing of the cochineal insect. This insect is related to the scale insects. It is a native of Mexico and Peru. As early as 1518 it was introduced into Europe. In its native country it undoubtedly feeds upon several species of cactuses, but in cultivation it is confined to *Nopalea coccinellifera* (Fig. *B*), which is now universally known as the cochineal cactus. The natural history of the cochineal insect is interesting. Both male and female are bright red in color, but the latter, from 150 to 200 times as numerous as the former, are alone used as a dye. In the Canary Islands these insects are reared in the winter, and from May to July the females are put upon the cactus plants. As soon as collected, in August or September, they are killed by hot water, steam, or by being placed in an oven, and then prepared for market. Since the introduction of aniline dyes the cochineal industry has suffered severely. In 1869, the amount exported from the Canary Islands, where by far the most is produced, was 6,310,600 pounds. In 1886, this had fallen to 1,449,968 pounds. The price of the dye has also fallen from two shillings per pound in 1880, to one shilling in 1886.

The cactus family, cacteæ, includes about 1,000 species, of which all but one are native to the western hemisphere. This one vagrant child is a species of rhipsalis or willow-cactus. Several cactuses of the genera opuntia and nopalea are naturalized in various parts of the world, however. A general view of the divisions of the family may be had from the following:

1. *Melocactus*. Link and Otto. ("Melon-cactus.")

Species about 30, in Mexico, West Indies and south to Brazil and New Granada.

2. *Mamillaria*, Haworth ("teat-like"). Figs. *E* and *F*.
    3 sub-genera;
    1. *Eumamillaria*.
    2. *Coryphanta*.
    3. *Anhalonium*.

Species about 300, occurring from New Mexico to Brazil and Bolivia.

3. *Pelecyphora*, Ehrenberg ("hatchet-bearing"). Fig. *U*.

Species 1, Mexican.

4. *Leuchtenbergia*, Hooker (named for Prince Leuchtenberg). Fig. *O*.

Species 1, Mexican.

5. *Echinocactus*, Link and Otto ("Hedge-hog cactus"). Figs. *D*, *G*, *H*. Including *Malacocarpus*, *Gymnocalycium* and *Astrophytum*.

Species about 200.

6. *Discocactus*, Pfeiffer ("disc-cactus")

Species 2, in West Indies and Brazil.

7. *Cereus*, Haworth ("flexible"). Figs. *A*, *Q*, *S*, *W*, *CC*. Includes now *Pilocereus*, *Echinopsis* and *Echinonyctanthus*.

The genus is now divided into the following five subgenera:

1. *Echinocereus*.
2. *Eucereus*.
3. *Lepidocereus*.
4. *Pilocereus*.
5. *Echinopsis*.

The species are in the neighborhood of 200, growing from the southwestern United States and West Indies to the Galapagos islands.

8. *Phyllocactus*, Link ("leaf-cactus"). Fig. *OO*. Including *Disocactus* (not discocactus).

Species about a dozen, from tropical North America to Brazil.

9. *Epiphyllum*, Pfeiffer ("upon a leaf"). Species 3, Brazilian.
10. *Rhipsalis*, Gærtner ("willow branch"). Figs. *L* and *M*.

It is divided as follows into sub-genera:

1. *Eurhipsalis.*
2. *Lepismium.*
3. *Hariota.*
4. *Pfeiffera.*

The last three names were formerly used for distinct genera. The species of rhipsalis number about 30, of which one is native to southern Africa, Mauritius and New Zealand. The remainder occur in tropical America.

11. *Nopalea*, Salm-Dyck ("Nopal," Mexican name for cactus). Fig. *B*.

Species 3, in Mexico, West Indies and South America. *Nopalea coccinellifera* is cultivated for the rearing of the cochineal insect. It is native to the West Indies.

12. *Opuntia*, Miller ("Opus," an ancient city). Figs. *I*, *P*, *PP*, *R*, *T*.

About 150 species are described. They inhabit North America from Canada to the tropics.

13. *Pereskia*, Miller (named for Nicholas F. Peiresk). Fig. *J*.

About a dozen species occur in tropical America.

OPUNTIA FRUIT AS FOOD.

A NOVEL AND ATTRACTIVE KIND OF POMOLOGY.

WHEN we reflect that the tomato, now one of the most common vegetables, was cultivated only as an ornamental plant within the memories of many people now living, and that the now universal potato was formerly regarded as a noxious herb, the prediction that prickly pears, or opuntia fruits, will become popular when the better sorts are known, does not seem unreasonable, when applied to the warmer parts of the temperate zones. It is true that both the potato and the tomato are of tropical origin; but we cultivate them as annuals, while no annual form of fruit bearing cactus has yet been found. Where they are now cultivated for eating, their perennial nature is a valuable characteristic; for the fruit forms and grows slowly after the blossom wilts, and in many instances, remains on the plant until the following spring, when it ripens at a most desirable time. The mature fruit remains perfect a long time, and is firm and hard enough to be easily marketed. The cactus is a profitable and valued crop in Mexico The fruits vary in size, some being small like a robin's egg, and some as large as the egg of a turkey. They also vary in color, having all the shades of yellow and orange, often scarlet on one side, and the deepest crimson or lake. The juice of some sorts is especially fine in color, a quality which it imparts to jellies made from the fruit.

In Mexico the fruit is known as the *tuna*, and must not be confounded with the inferior opuntia fruit, which is the only sort known to many. When the different varieties become known, and each receives a name to distinguish it, they will be better appreciated.

Scarcely a plant known requires so little care in cultivation, and is so indifferent to the soil, provided it is well drained; but it is partial to either sand or gravel; When the fruit is ripe the fine spines upon its surface are readily removed by wiping or brushing the fruit. For this purpose a bunch of grass is usually employed by the Mexicans. Care must be exercised in gathering the fruit. Either a pair of wooden tongs is used, or the fruit is cut off with a long-handled knife, and then picked up from the ground. Removing the skin from the fruit is somewhat difficult for the beginner, but dexterity is soon acquired. A thin slice is cut from each end of the fruit, and the skin, after being cut through from end to end, is readily removed. The fruit, if kept cool before being served, is much more delicious. The flavor has been compared to that of a watermelon flavored with strawberry. It is regarded as an especial delicacy of the breakfast table, and is relished by strangers and natives alike. It is now often found for sale in the markets of the large cities in the United States, but it is either bought as a curiosity, or used to give variety to fancy baskets of fruit. When it becomes abundant it will be utilized for its good qualities. The cultivation of the cactuses is so simple, usually being nothing more than the first planting, and its annual supply of fruit is so regular, that it strongly recommends itself to people with more land than time to devote to fruit raising.

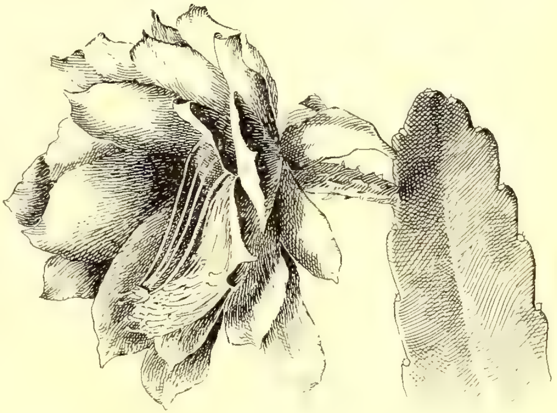


FIG. OO. A SEEDLING PHYLLOCACTUS.

When hybridizers cross the hardy prickly pear (*Opuntia vulgaris*) with some of the large-fruited southern sorts, we are likely to obtain truly valuable additions to our northern fruits. None of the opuntias are especially delicate or sensitive to cold.

New York. WALTER DALTON.

CACTUS LANDSCAPES.

THE SINGULAR CACTUS FLORA OF OUR GREAT SOUTHWEST.

THERE are 140 species of the cactus family in the United States, all of which are embraced in five genera, or practically in four genera, as the fifth contains only one species. The four principal genera are as follows: cereus, 34 species; echinocactus, 23 species; mamillaria, 30 species; opuntia, 52 species. It is difficult to describe the differences between these genera in popular language. There are but two or three species growing east of the Mississippi river. About half a dozen species are spread over the Great Plains between the Missouri river and the Rocky Mountains, a few of them reaching into Montana and Idaho. In Utah and Nevada many additional species occur, mostly species which are also common farther south. But in the desert region of the southwest, extending from western Texas, through New Mexico, Arizona and southern California, the species become very numerous, and form a characteristic feature of the vegetation. The distribution of the species is by no means uniform, however. Some species are spread over nearly the whole field, while others are more or less restricted. We can here only take notice of such species as would either on account of their abundant and constant appearance, or from their peculiar and striking characters, attract the attention of the traveler.

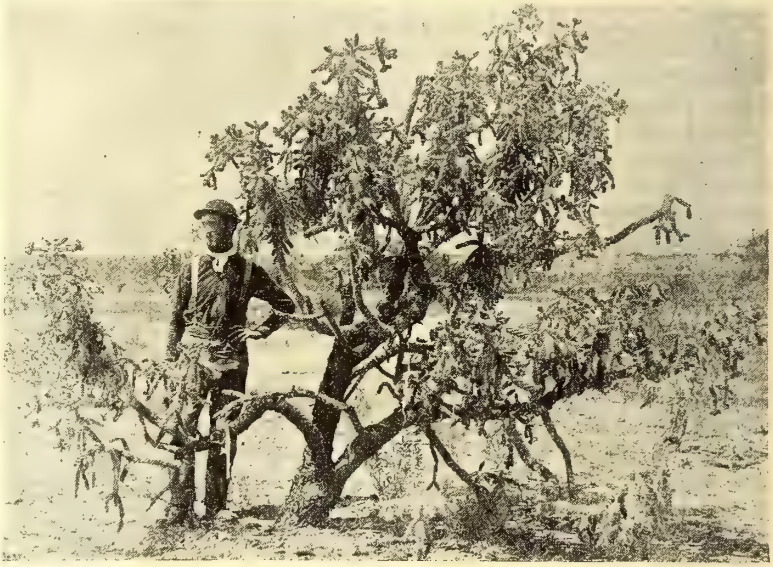


Fig. P. A Plant of Opuntia Whipplei.

The species of the genus mamillaria are mostly small roundish pulpy bodies, seldom more than three or four inches in height or diameter, studded with tubercles which are densely covered with spines. Most of the species of the genus echinocactus are also low, ovate or cylindrical-ovate bodies, marked by more or less prominent ribs running from base to apex, on which are situated the tubercles and spines. The same general statement will apply to many of the species of the genus cereus, especially of those inhabiting New Mexico and Texas. In Arizona and southern California some of this genus have tall, columnar trunks.

The genus opuntia, commonly known as prickly pear, has some species with flattened, and some with cylindrical, branching joints. Some of the species are low or spreading on the ground, and others assume a branching or bushy form.

A favorite region for cactus plants is in western and southern Texas; especially do they abound on the hills and bluffs of the Rio Grande river, extending up the country of the Pecos into New Mexico and over the region formerly known as the Staked Plains.

In southern and southwestern Texas, in the countries bordering the Rio Grande, several species of the flat-jointed opuntias, particularly *Opuntia Engelmanni* and *Opuntia Lindheimeri*, occur. These grow from four to six feet high, extending over large tracts of country and sometimes forming thickets which it is difficult to pass through.

Within a few years the cattle raisers of this region have found means of utilizing these plants for the feeding of cattle. Ordinarally, cattle do not touch these plants, but when driven by hunger they attack them, notwithstanding the cruel spines or needles with which they are armed. It is found that by burning the spines so as to destroy the points they are rendered comparatively harmless. Some feeders use a cutting box prepared for the purpose, and by holding the cactus joints in a proper direction cut off the spines with rapidity and also cut the joints into pieces to feed to the cattle. They frequently mix them with meal or bran or cottonseed meal, and in this manner fed to cattle they are said to be of great value. Sheep and hogs are also fed upon them. It is also stated that the young joints of the cactus are used in early spring by the Mexican population of western Texas as food. They are cut into small pieces, mixed with flour in a batter, and fried. This dish is said to be as palatable as egg-plant.

The common name of these large opuntias among the Mexicans is Nopal, although that name belongs more properly to a similar Mexican species (*Opuntia Ficus-Indica*, or Indian Fig, Fig. R.) which is cultivated for the sake of its pulpy fruits, which are highly esteemed and sold in all the markets. Another notable and related species is cultivated for hedges and is naturalized about the old Missions in southern California. It is called Tuna (Fig. T), and grows ten to fifteen feet high. Its fruit is large, well flavored and edible.

A western variety (var. *occidentalis*) of the *Opuntia Engelmanni* occurs on the western slopes of the mountains in southern California. This has stout woody stems, with innumerable branches, amounting to sometimes over 100 joints. It was found northeast of San Diego at elevations of 1,000 to 2,000 feet, in immense patches, often as large as half an acre. Dr. Bigelow also found it 40 miles east of Los Angeles in extensive areas.

Another species of similar habit, but somewhat smaller, occurs throughout Arizona and the desert region of California. It is the *Opuntia angustata* (Fig. PP.) It grows in large patches of eight to ten feet in extent, mostly prostrate, but with some of the branches standing three or four feet high. The joints are six to ten inches long, obovate, gradually narrowed to the base, and with more numerous fascicles of spines than in *O. Engelmanni*. The pulpy fruit is perhaps, about 1½ inches long, and 1 inch in diameter.

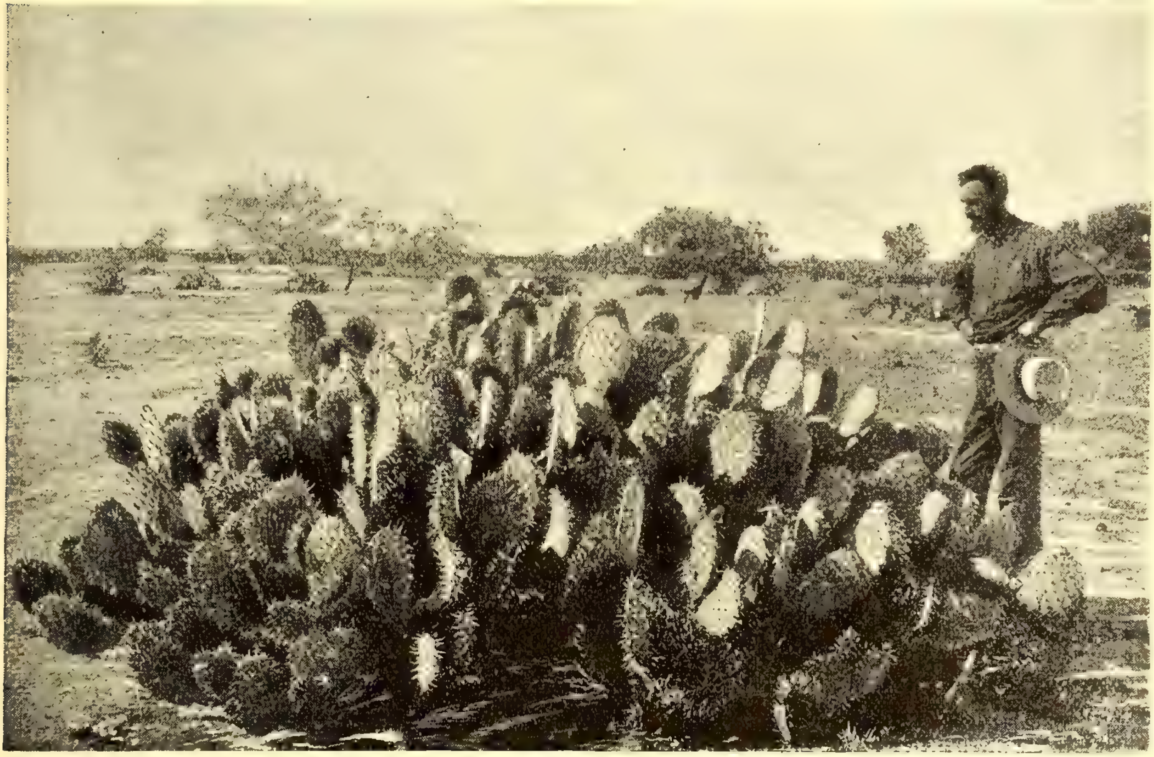


FIG. PP. A CACTUS LANDSCAPE. (*Opuntia angustata.*)

Some of the opuntias have cylindrical joints or branches. The one most widely diffused is probably *Opuntia arborescens*, or "tree opuntia." This comes into view in northeastern New Mexico, where it may be seen by travelers, along the line of the railroad, a strange naked looking, erect, stiff object three to six feet high with half a dozen rigid branches standing out at all angles, and displaying their savage spines. In the hills about Santa Fe they are abundant. From here they extend westward into Arizona and southward on rocky ridges and barren mesas into Texas and southern New Mexico.

Of the cylindrical branched opuntias there are in Arizona two or three species (particularly *O. Whipplei* and *O. Bigelovii*) which attain a height of ten or twelve feet, with an erect woody stem and many spreading branches. In *O. Whipplei* the young joints are four to twelve inches long, and one-half to three-fourths of an inch thick. This curious plant is shown in Fig. *P*. Several smaller species attain a height of four to six feet.

These opuntias are very conspicuous in the valleys of the Gila and Bill Williams mountains of Arizona, and both men and animals give them a wide berth on account of the innumerable forbidding spines with which they are covered. It would seem as if vegetable life in this region is so precarious and exposed to so many dangers that nature finds it necessary to protect the plants by an armor of the most forbidding and offensive kind.

The genus echinocactus, including the barrel cactuses, is perhaps the most formidable of all in its defensive armor. Here the spines, or a part of them, are generally flattened and thickened at the base, and gradually narrowed to a sharp point like a shoemaker's awl. They are sometimes three or four inches long and very stiff, so that they are capable of inflicting serious wounds. In some species these spines are hooked at the point, and catch hold of the clothing or any object coming in contact with them.

One of the largest of this genus is *Echinocactus Wislezenii*. It is roundish-ovate or oblong in form, growing under favorable circumstances 3 to 5 or more feet high, and 1 or 2 feet in diameter. It has from 21 to 25 ribs running from apex to base, which are covered with clusters of spines at frequent intervals. Notwithstanding its formidable appearance, the inhabitants of the country have learned that it contains an abundant watery pulp, to which they often resort for the quenching of thirst. This pulp is also sometimes prepared like citron into a pleasant confection. Fig. *D*. represents a good specimen of *Echinocactus Emoryi*, a species found on the Lower Colorado. It attains a height of three feet, and a diameter half to two-thirds as great. The flowers are clustered near the top. They are about three inches long, dark brown purple outside, and red and yellow inside.

But by far the most striking objects of the cactus family are the giant trees of the genus cereus, of which *Cereus giganteus* is the chief (Fig. *A*). Half a dozen of these have been transplanted to the yard attached to the railroad station at Tucson, Arizona, where they can be seen by travelers. But farther west they can be seen from the cars in many places. On the slopes and at the base of hills and rocky steeps they frequently attain a height of 50 or 60 feet. They are sometimes unbranched, appearing like massive cylindrical columns, but often they have two or three or even as many as nine branches, which immediately after leaving the trunk turn upward and grow parallel with the main stem, presenting the appearance of an immense candelabrum. The trunk is often 2 feet in diameter. They are not found above the altitude of 3,000 feet. They seem to thrive best in the most desolate and arid localities, on the slopes of valleys and on the desert plateaus. These trees, so unlike anything familiar to northern travelers, are the most striking objects of this great desert region. I surveyed a group of these giants with emotions of wonder and admiration. In the vicinity were seen many young plants growing under the shade of the green-barked acacia, which acts as a nurse plant in protecting the young cereus in its early stage of growth.

The center of the trunk is composed of a juicy pith, four to six inches in diameter; surrounding that is a cylindrical frame work of woody bands, tough and elastic, and externally is a fleshy or pulpy coating which communicates with the pith through openings in the wood. The flowers are borne near the summit, and are succeeded by a roundish fleshy fruit, of the consistency of a fig, and of a sweet but rather insipid taste. This fruit the Mexicans call *pitaya*. It is dislodged from the tree by means of a long light pole with a fork at the end. Two other species of tree cactus occur in the neighboring province of Sonora, Mexico, and another or two in the peninsula of California, and in South America there are several others.

Washington. GEORGE VASEY.

CACTUSES UNDER CULTURE.

NEGLECTED PLANTS OF PECULIAR CHARM.

NOTWITHSTANDING the interesting forms and magnificent flowers of the cacti, these plants are often unappreciated by those who should grow them. They are no favorites with the "regular gardener," who says that they are "stubborn, flower when they like, and are not fitted for exhibition." This is because he knows little of their culture. They will not respond to his unnatural forcing like roses and pelargoniums, but a little attention to their few real wants meets a grateful response.

Cactuses need dryness and a temperature a few degrees above freezing during their rest, and the hottest sunshine and plenty of water when flowering. No plant is more easily grown than the cactus, when its habits and cultivation are once understood. It is as peculiar a growth as can be found. The foliage has become dwarfed and stunted, or in most cases it has disappeared. The whole organism, accustomed at times to long drought, takes in water greedily at its rootlets after every rain, and stores it away for future use in its thick, sponge-like and water-tight tissues. The surface of the stems is covered with a thick, shiny skin which prevents undue evaporation, a sort of vegetable macintosh or "gossamer" coat, which retards transpiration. There are rarely any flat leaves to wither and die in the scorching air, but the thick and jointed stems do their work, absorb carbon from the air and save up water for the dry season.

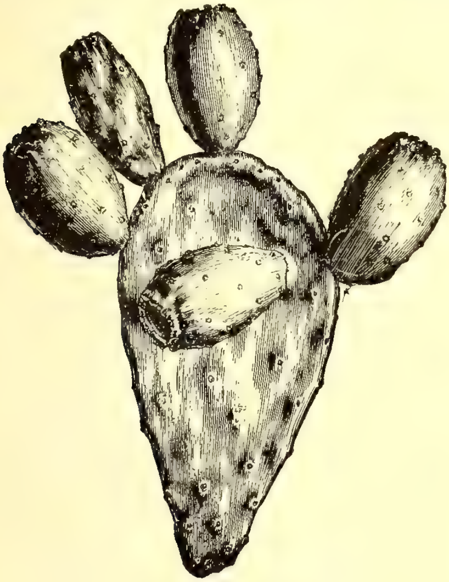


FIG. R. OPUNTIA FICUS-INDICA.

These stems vary greatly in shape and size; some are small and pretty, with miniature flowers, beautiful in form and coloring; some, thick and jointed, spread over the ground in all directions; others send straight, polygonal shafts over fifty feet in the air. Some of them are shaped like great melons set on end; others are perfect hemispheres in outline, curiously ribbed and furrowed. Square and triangular stems are not uncommon; and some of the trailing kinds are even graceful, whether in hanging baskets or climbing over their native hills. All forms of the cactus are tenacious of life to a wonderful degree.

Their brilliant flowers are fertilized by night moths or by butterflies, for many of them give the first freshness of their bloom to the stillness of the tropic night. Much of the fruit is edible, and is commonly used where abundant. An English author says that they are desirable plants to grow in conservatories attached to dwellings, because the flowers give off no odor; but he had probably never inhaled the fragrance from a night-blooming cereus. However, the most highly scented ones are not in any way offensive to the olfactories.

A climbing cereus will, in time, fill a glass house like a Maréchal Niel rose bush, if allowed to grow; and a dome of good height is wanted to shelter a *Cereus giganteus*, but smaller specimens are easily managed and bloom freely. It is not well to cut and trim them, for on the old and discolored growths come the most abundant flowers, as all successful growers know. The gardener fond of "cutting back" will get but poor satisfaction from them if he wants flowers. Some of them are good for hedges in their native lands, but hedge treatment will not be good for them in our artificial surroundings. Those that attain a fairly good size, like the most common forms of red or pink cereus and opuntias, are more easily grown if placed in pots about fifteen inches in diameter. The process of getting these well filled may be accelerated, in the case of a cereus, by putting in a number of small plants instead of one.

In winter keep them out of sunshine, but where it is light, cool and dry. Dampness when they should be at rest is their great enemy, and causes them to decay. When they show signs of freshness and growth, remove them to the hottest sunshine. Should the season be sufficiently advanced, they can be put in the open air at once, and when the flowers come they will be all the finer for it; but if growth is already well advanced, the sudden change may kill the buds. Give plenty of water now, without fear of injury, if the earth they are in is well drained. They require but little earth, and like a good proportion of sand. Broken shells, bones or substances containing lime mixed with the soil seem to be relished by some. A little fertilizing is beneficial.

The great Linnæus knew only a few species of cactus but botanists now tell us that the number of known genera is over a dozen, with over eight hundred species, and others being continually discovered.

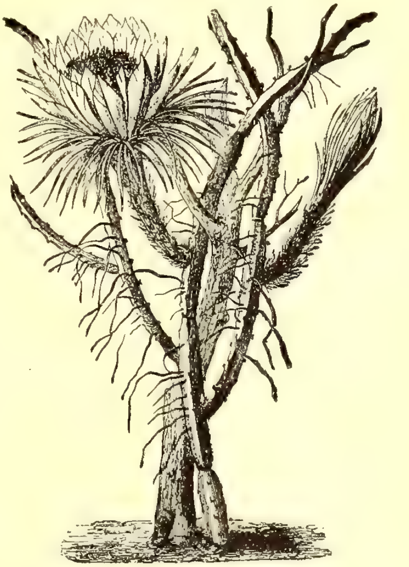


FIG. S. CEREUS NYCTICAULIS.

M. DE LOUP.

THE CACTUS FAMILY.

THE remarkable diversity of curious forms exhibited by cactus plants, and their growth and retention of vitality under apparently adverse circumstances, combine to render the group perhaps the most interesting in the vegetable kingdom. The gigantic cereus rears its massive columnar stem to a height of sixty feet, while the beautiful mamillarias are but a few inches high. Some, as the old man cactus (*Pilocereus senilis*), are densely covered with strange long hairs that impart a weird aspect to the plants; others, as in the genus echinocactus, are covered with gigantic spines, which not only appear formidable, but actually pierce the flesh, as would needle-pointed spikes of steel. These spines are sometimes barbed, and when any such enter the skin their extraction is no easy or painless matter. In other species again, they are very minute, barely visible to the naked eye, and these are the most troublesome of all. The least touch is sufficient to cause them to adhere to one's person. With gloves and proper caution, however, there need be no difficulty about handling the plants.

The flowers are usually large and showy, and frequently deliciously scented. One species, *Cereus McDonaldiæ*, produces flowers which measure fifteen inches across, and as much in length. The colors are varied—scarlet, crimson, salmon, purple, rose, pink, yellow and white being the most desirable tints.

The majority of cactus flowers retain their full beauty but a short time, and the most conspicuous are of shortest duration. The night-blooming cereuses afford the largest and most showy flowers, and these last but a few hours. They expand a short time before sunset, and close, never to open again, before sunrise. One glimpse of their nocturnal beauty, however, compensates for this in overflowing measure. The genera phyllocactus and epiphyllum are the most useful as flowering plants.

The latest authorities have arranged cactuses under thirteen genera, and each of these is placed in one of two tribes. The first tribe, named echinocacteæ, is distinguished by having the calyx tube elongated beyond the ovary, the stems, usually destitute of leaves, being traversed by longitudinal ridges, or beset with tubercules. The genera melocactus, mamillaria, pelecyphora, leuchtenbergia, echinocactus, discocactus, cereus, phyllocactus, and epiphyllum come under this head. The genera rhipsalis, nopalea, opuntia and pereskia are placed in the second tribe, which is termed opuntiæ. Here the stems are branched or jointed, and the calyx does not extend beyond the ovary. Under the genus melocactus, commonly called melon or turk's cap cactus, there are about thirty species, which inhabit the dry hot parts of Mexico, Brazil and the West Indian Islands. The stems of these species attain a height of three feet, being fleshy, globular and regularly ridged, the ridges bearing stout spines in clusters. Each plant bears at the top a thickly-set mass of spines and hairy matter, which, in common language, is termed the cap. Upon this the small reddish flowers are borne, and are succeeded by bright red fruits. *M. communis* is the most desirable species.

The mamillarias, or nipple-bearing cactuses (see Figs. *E* and *F*), are exceedingly beautiful and interesting little plants. They are seldom more than a foot high, and most frequently attain a size of only three or four inches. The tubercules, exhibiting various oblong or globular outlines, are arranged spirally, and bear a cluster of spines at the apex. There are over three hundred species and the genus occurs in North and South America and the West Indies. Some of the North American species inhabit mountainous regions, where they are subject to several degrees of frost. The flowers proceed from the base of the tubercules, but are not so interesting as the arrangement and general appearance of the spines.

The following description, by Dr. Lindley, of *M. tenuis*, comparatively a poor species, will be sufficient to show that even the most insignificant forms are worthy of study. He says: "Gentle reader, hast thou never seen in a display of fire-works a crowd of wheels all in motion at once, crossing and intersecting each other in every direction, and canst thou fancy those wheels arrested in their motion by some magic power, their rays retained, but their fires extinguished and their brightness gone? Then mayest thou conceive the curious beauty of this little herb, a plant so unlike all others that we would fain believe it the re-animated spirit of a race that flourished in former ages with those hideous monsters whose bones alone remain to tell the history of their existence in the quarries of our sandstone, slate and clay." This extract is taken from the *Botanical Register*, where it appeared in 1832. Many new species of mamillaria, even more beautiful than the above, have been discovered since then.

The genus pelecyphora is a near relative of the mamillarias, and contains only one species, namely, *P. aselliformis* (Fig. *U*). It is commonly called the hatchet cactus. The stems are about six inches high, and usually appear in clusters when the plant is old.

The flattened tubercules have been supposed to bear some resemblance to a hatchet, and, instead of spines at the apex, they are furnished with two rows of hard scales, which appear like those on the back of a wood-louse; and these suggested the specific name. The flowers, borne at the apex of the plant, are large and of a showy purple color. There are several varieties, and all are natives of Mexico.

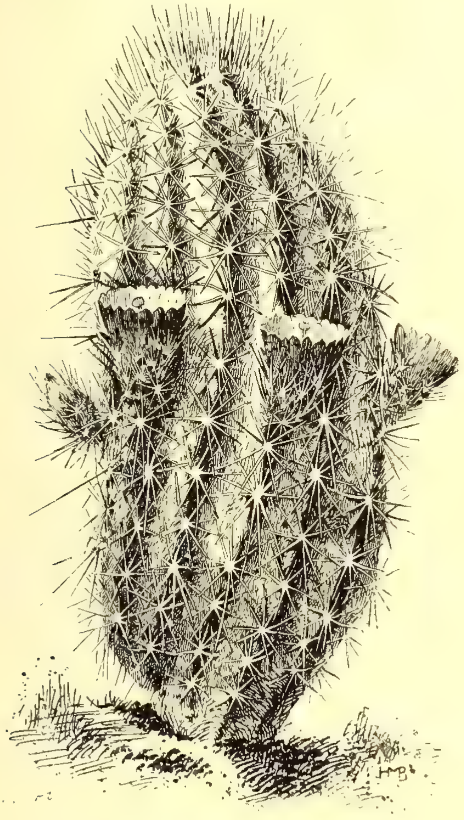


Fig. Q. Cereus chloranthus.

The leuchtenbergia, as in the preceding genus, has but a single representative, *L. principis* (Fig. *O*). If we except the flowers, it bears very little resemblance to any other form of cactus, being, in fact, more like an aloe. The erect, cylindrical, and woody stem is surmounted by triangular tubercules, about six inches in length, which bear tufts of dry, rough vegetable fibre at their extremities. The stem varies in height from one to twelve inches, the lower part of the old plant being clothed with the scale-like remains of former tubercules. The large yellow flowers are borne from the axils of the younger tubercules. It is a native of Mexico.

About two hundred species of echinocactus (See Figs. *D*, *G*, *H*), or hedgehog cactus, have been found in Mexico and various parts of South America. The globular, cylindrical, or oblong stems of these plants range in height from a few inches to nine feet. They are ridged. The ridges, which are furnished with large and small spines, take a vertical or spiral course, being sometimes divided, so as to form more or less distinct tubercules. The large showy flowers, with red, yellow, purple and white as prevailing colors, open several days in succession during bright weather.

The genera malacocarpus, gymnocalycium and astrophytum, still referred to in trade lists, are now placed under echinocactus. *E. myriostigma* is one of the most singular plants. The stem attains a height of six or eight inches and is regularly divided into either five or six triangular ridges, upon the apex of which, at the summit of the plant, the pretty yellow flowers are freely borne. Spines are conspicuous by their absence, cushion-like tufts of short brownish hairs, regularly disposed along the apex of the ridges, appearing in their stead. The numerous small white spots which mark the surface have a very pleasing effect against the dark green epidermis. It is a native of Mexico, and commonly called the bishop's hood cactus; but the solidity of the plant, and its mathematical accuracy of form are more suggestive of the exact proportions of a well-executed metal casting than the work of a hatter.

The discocactus is a small genus of two or three species, which bear some resemblance to small echinocacti. They are found in Brazil and the West Indies. The stems, bearing blunt spiny ridges, are about two inches high, and have the form of a flattened globe. The flowers emerge from a woolly mass at the top, and those of *D. insignis* have a very pleasant odor. Discocactus should not be confounded with the old genus disocactus, which is now referred to phyllocactus.

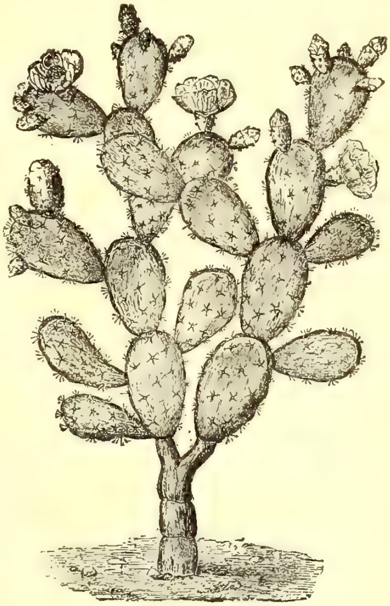


Fig. T. Opuntia Tuna.

The species of cereus, over 200 in number (see Figs. *A*, *Q*, *S*), have a very extensive distribution, being found in temperate and tropical America, the West Indies, and Galapagos Islands. They are of erect or scandent habit, their stems, which vary in height from a few inches to 60 feet, being columnar, globose or triangular. Tufts of spines generally appear on the ridges of the cylindrical types, and also on the edges of the angular ones. The flowers are showy, sometimes fragrant, and some kinds produce the largest found in the family. These, however, are short-lived, and last only through the night during which they expand. The plants commonly known under the generic names of echinocereus, pilocereus and echinopsis, are now named only as sub-genera of cereus.

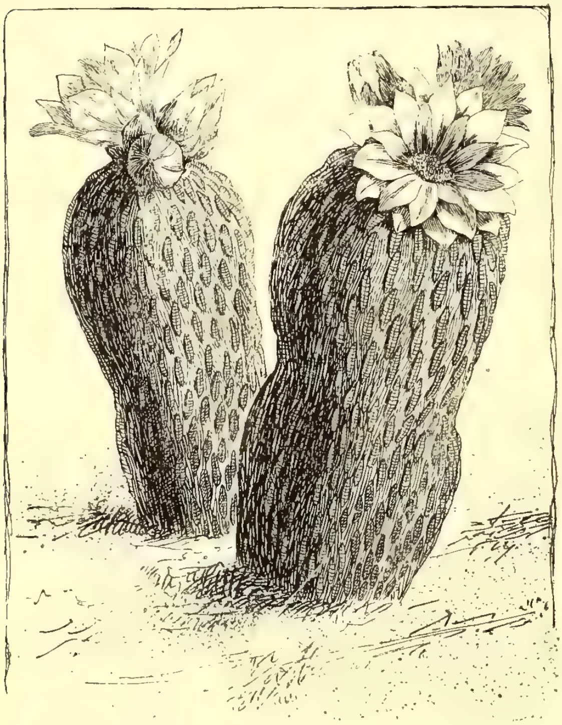


FIG. U. PELECYPHORA ASELLIFORMIS, VAR. CONCOLOR.

The thirteen species included under the genus phyllocactus are natives of tropical America, and grow among other epiphytes on the trunks of trees in dense forests. The stems are branching, jointed, flattened (leaf-like), or angular, and notched along the edges. The brilliant and conspicuous flowers proceed from the notches, and last a comparatively long time in perfection. In some species they are fragrant. The *Disocactus biformis* of Lindley is now placed in this genus.

There are only two species of epiphyllum, or lobster cactus—a name suggested by the color and elongated form of the flowers—but they are very beautiful plants, and inhabit the mountainous districts of Brazil, being found there on trees as epiphytes, and occasionally as terrestrial plants in dry, rocky situations. The jointed stems are flattened, and assume a somewhat cylindrical form when old. They are long and slender, droop gracefully and branch freely. The branches are composed of little pieces about two inches in length, truncate at the top and held together in the center. The margins are notched. The showy crimson or rose-colored flowers are borne in great profusion at the extremities. The genus rhipsalis, or mistletoe cactus (Figs. *L* and *M*)—the fruit resembles the berries of the mistletoe—includes about thirty species, which were formerly known under some one of the generic names, eurhipsalis, lepismium, hariota and pfeiffera. They are mostly natives of tropical America, only one species being found in the Old World. They are branching epiphytes, with flattened, angular or cylindrical stems and insignificant flowers. The great variety of stem is their chief feature of interest.

Under nopalea (Fig. *B*) we have three species of plants which are distinguishable from opuntias only by technical characteristics of the reddish flowers.

The opuntias, or prickly pears (Figs. *I*, *P*, *R*, *T*)—in reference to the pear-like outline of the fruit—constitute a genus of over one hundred and fifty species They are, in common with nopaleas, natives of the warmer parts of America and the West Indies, being, perhaps, found in the greatest profusion in Mexico. The erect or decumbent fleshy stems branch freely, are jointed, flattened or cylindrical, sometimes tuberculed, and usually bear clusters of minute or coarse, barbed spines. Occasionally small fleshy leaves appear at the base of the spine clusters on the young stems, but they soon fall away. The majority of species may be readily known by the elliptical or oval form of the joints. The flowers are orange or yellow. Indian fig is another common name for members of this genus.

Some of the thirteen species of pereskia (Fig. *J*), natives of tropical America and the West Indies, would appear, from their shrub-like branches, leaves and flowers, to be connecting links between the more exceptional forms of cacti and ordinary vegetation. The stems, however, are succulent when young; but they become hard and woody with age, and bear the clusters of spines peculiar to cactaceous plants. The solitary or paniculate flowers are borne at the extremities of the young branches, and in some species resemble a single rose. They are very showy, the color being white, red or purple. *P. aculeata* is commonly known as the Barbadoes gooseberry, from the resemblance of the fruit to that of the real gooseberry.

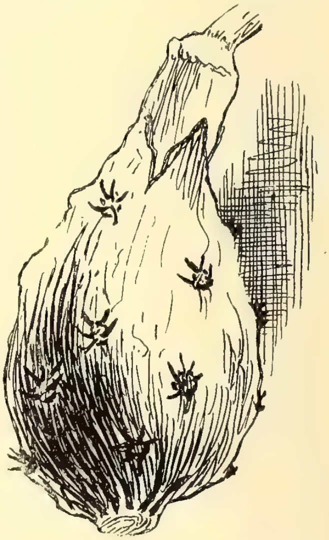


FIG. W. CEREUS GREGGII FRUIT.

Comparatively few of these plants contribute toward the immediate necessities of man, but doubtless they are all of importance in the larger economy of nature. The untold generations through which they have existed, may ultimately result in the barren regions they inhabit becoming better adapted to the requirements of other plants, more useful in the arts and sciences. Dr. Carpenter, in his "Physiological Botany," gives the following curious instance of their work, as civilizers of the earth: "On Mount Etna, for example, and its volcanic fields, it is the Indian fig which the Sicilians employ to render such desolate regions susceptible of cultivation. This plant readily strikes into the fissures of the lava, and soon, by extending the ramifications of its roots into every crevice of the stone, and bursting the largest blocks asunder by their gradual increas, make it capable of being worked." The Mexicans eat the fleshy stems of *Cereus pectinatus*, which they call *cabeza del Viego*, as a vegetable; and they use the larger spines of *Echinocactus Visnaga* as toothpicks. The Mexican Indians use the fruit of the saguaro (*Cereus giganteus*) as an article of food. Several species of opuntia, particularly *O. Tuna* (Fig. *T*), yield the red, green or yellow fruits known as prickly pears. These are sweet and juicy, and extensively used as dessert by the Mexicans and inhabitants of southern Europe. Their juice is used as a water color at Naples, and for coloring confectionary in the West Indies. The yellow fruits of the Barbadoes gooseberry are made into preserves by the people of the West Indies, and otherwise used as the English and Americans use ordinary gooseberries. *Nopalea coccinellifera* is valuable, in common with some species of the latter genus, as affording means of subsistence to the cochineal insects. In protracted seasons of drought, wild and domestic animals tear open the spiny covering of the fleshy-stemmed kinds of cactuses, such as melocactus, echinocactus, etc., and quench their thirst with the juicy interior, and travelers have frequently told of the numerous cases in which human lives have been saved through the timely refreshment afforded by those natural reservoirs on the desert plains of tropical countries.

GERALD HASTINGS

THE GENERAL MANAGEMENT OF CACTUSES.

THE dwarf habit of the mamillarias renders them admirable subjects for window gardening. The best window is one which faces south. In such a position the plants require little attention beyond watering, and they are ever a source of interest and pleasure. The night-blooming cereuses (*C. grandiflorus*, and others) the old man cactus, phyllocacti, the tender epiphyllums, and, indeed, most other forms of cactuses may, with ordinary care, be successfully grown in a window. Epiphyllums and phyllocacti are among the most popular of our winter and spring-flowering stove and greenhouse plants. The scandent species of cereus are seen to the greatest advantage when trained against a wall or on rafters in a sunny greenhouse. One pendulous species, *C. flagelliformis*, the rat tail cactus—makes a pretty hanging-basket plant. Cactuses may be placed out-doors in summer without detriment, and a bed of them gives pleasing variety. They should not be turned out of the pots, but plunged, slightly over the rim of the pot, in the soil of the bed or border, which should be at least twelve inches above the ordinary ground level. Water is not so apt to accumulate about the roots to a dangerous extent during wet weather, when the soil is raised in this manner. The introduction of rocks and boulders among the larger specimens, in outdoor work would add much to their effectiveness.

The culture of cactuses is not commonly understood. The native soil is reproduced with an accuracy that leaves little to be desired, but it is forgotten, or impossible, to supply the native climate. One is useless without the other; and, since the climatic conditions must be artificial, so the soil must be of a character to meet the wants of the plants under the altered circumstances. Rocky or barren sandy mixtures have been proved absolutely worthless for established and healthy growing plants. The mamillarias and other small growing kinds succeed best in a mixture composed of two parts of rich fibrous loam, to one of peat, and one of sand. The more robust kinds thrive better when the mixture contains an additional part of loam. Water is usually applied too sparingly during the growing season, and too freely in winter. The free growing kinds, such as cereuses, phyllocactuses, opuntias, etc., will require water about once a week during the latter period, and for those of slower growth about once a month will be sufficient. The soil in which any of the species are planted should not be allowed to become dust dry in summer.

Cactuses shipped from their native soil and climate to more temperate localities should be treated in a peculiar manner. Place them in the sun to dry immediately after unpacking. Two or three days of bright sunshine will suffice to dry them thoroughly; and afterwards they should be planted in dry sand, placed in a position fully exposed to the sun, and kept perfectly dry until growth commences; then they may be potted in the regular compost, and otherwise treated as established plants.

The propagation of cactus plants is generally an easy matter. Any of the species may be grown from seeds; those with elongated stems, such as cereuses, opuntias, epiphyllums, etc., from cuttings of the young growth;

and species of mamillaria, and others with short stems, from offsets treated as cuttings. Delicate mamillarias are sometimes grafted upon a cereus of stronger character, while the drooping epiphyllums and cereuses are improved in habit by being grafted upon erect forms of the latter genus. Stocks of *Pereskia aculeata* are also often used for epiphyllums, with good results.

The seeds may be sown in pots containing sandy loam, at any season of the year, but, preferably, as soon after they are ripe as possible. Keep the soil moist, and the pot covered until germination takes place, when the covering may be removed. If placed in a temperature of eighty degrees, they will germinate in about three weeks; but they may be raised in a much lower temperature, such as that of a room or window, though the process is much slower in such cases. Great care will be required in watering for some time after germination, as the little seedlings advance slowly and are very easily injured by an excess of moisture. When large enough to be handled without difficulty they may be potted separately, and treated in the same manner as older specimens.

Cuttings and offsets should be exposed to sunshine for about a week previous to planting in sandy soil, and subsequently kept perfectly dry, in a warm sunny house, until growth commences. Water may be given in moderate quantity from this time, and increased in volume, according to requirements, as the plants develop. Good roots having been formed, turn out the plants, pot in the ordinary compost, and place them with their elders.

In grafting mamillarias it is simply necessary to cut off the upper portion of the stock, which should be dwarf, so as to leave a smooth horizontal surface at the top. The scion is prepared by removing a portion at the base, which should then correspond with the surface of the stock as nearly as possible. Now place the scion on the top of the prepared stock, and bind it thereto with matting or any other material that will answer the same purpose, just tight enough to keep it securely in position. The object of grafting in this case is to secure for the mamillaria a more perfect root system. With *Cereus flagelliformis* and the epiphyllums, as already indicated, it is different. These plants thrive most satisfactorily on their own roots, but larger and more shapely specimens are obtainable by grafting them on tall or erect stocks, and members of the latter genus flower more freely when so treated. The stocks should be grown quickly in such cases, and cut down to the required height, a point which must be determined according to the size of plant desired. If the stock is a cereus, the scions—pieces of the young growth about six inches long, trimmed at the base in the form of a thin wedge—may be inserted in corresponding notches at the top or on the sides, and fastened with a small pin, or, better still, a long prickle of pereskia, or some other cactaceous plant similarly furnished with prominent spines. In the absence of these, the scions may be bound in position as advised in the case of mamillarias. The pereskia stock is usually employed for epiphyllums, when medium-sized specimens are desired; and here the most reliable union is effected by grafting at the top. Scions may be inserted in the top of all branches of a branched pereskia stock with perfectly satisfactory results, provided it be done in the summer, which is the best time for all grafting. The manual part of the operations having been completed, place the plants in a close atmosphere, and keep them shaded from bright sunshine until a union is brought about. Their after-treatment is similar to that required by plants on their own roots.

The only disastrous disease to which cactuses are subject is a rotting of the stems, induced by a prolonged excess of moisture about the roots, by a severe bruise, or by a continually moist and close condition of the atmosphere in which the plants are grown. When this disease appears the affected portion should be entirely removed with a knife, and, after applying fresh slaked lime or powdered charcoal to the wound, expose it to sunshine till it heals. The soil and atmosphere, in the meantime must be kept severely dry.

Among insects the most troublesome are the green fly, the scale, and the mealy bug. Fumigation with tobacco and subsequent free use of water by means of the syringe will speedily disperse the first-named, but the other two are not so easily banished when they obtain a firm footing. It is strictly unwise to let either of these two pests get a hold in the cactus house, for, when once they gain the shelter afforded by the spines and hairs, their eradication is almost impossible. The best way to get rid of them is to remove all that are accessible with a pointed stick, and then syringe the plants with a mixture prepared as follows: Dissolve four ounces of whale-oil soap in five gallons of tepid water, and to this add as much kerosene as will go in a three-inch pot. These ingredients must be thoroughly mixed before applying with a syringe, and even while that operation is in progress a second person must be employed stirring the mixture vigorously. The object of this stirring is to prevent the kerosene from floating on top. Care should be taken to keep the preparation from reaching the roots, and also to syringe the plants thoroughly with clean water about thirty minutes after its application. It would be well to treat the plants, whether or not infested, periodically as here described, merely as a preventive measure.

We have now dwelt upon the more important cultural requirements of these curious plants. It should be remembered, however, that the instructions are general, and that particular cases must occur in which they will not be applicable. This refers more especially to the matter of watering, when so much depends upon local conditions. When the majority of these plants are established and thrive in a given position, they are hard to kill, but continued neglect will do its work anywhere, and in such cases the strongest efforts of even the foremost specialists would be wholly futile.

EDWARD BOWEN.

TARRYTOWN LETTERS—X.

BY A. B. TARRYER.

"GOOD gardeners are scarce, like good cooks, because the broad country is not propagating enough of them. They will be scarce as long as we spend our best teachings too exclusively on the centers, rather than equally upon the circumferences of population. We must give over the idea of outside barbarians. Saul was wrong and Paul was right. Said barbarians—just when we think they are used to our sewage, will sicken, go crazy and run around above us to die in our drinking water, or cut even more horrible capers; for it is the people we thrust outside that are continually coming back on us with social vengeances. Gardening and cookery degrade as the farmers become degraded.

"Blennerhasset could make a garden in the wilderness, but he was not aware that the deuce in the form of a politician could so easily come in from the outside and destroy it. Precisely so with our piddling, narrow gardening centers, which do not realize how the rare plants they are trying to cultivate are endangered by the weedy accidents of a cow-boy civilization. We must be clean outside as well as in."

Mrs. Tarryer and a couple of proficient dowagers of our acquaintance were talking about this very difficulty of finding safe and fit places for the trial of plants, old or new, in gardens, generally speaking, and one of them made the remarks above quoted. Something amiss is continually happening under our present gardening outfit. The cows break in, or the national botanist writes Mrs. Tarryer that "some vandal gardener has spaded under the sod of *Phleum alpinum*," grown safely for ages upon ages 10,500 feet above the sea in Montana or Wyoming.

Said dowagers are very individual women, whom I dislike to pass with totally inadequate specifications; but if I am to write, here in Tarrytown, for the eagle eye of my editor in the woods of Ithaca, by the 20th of June, such scriptures as my constant reader will think spot-knowledge of gardening in August, my human figures must go with the scant drapery of phrases.

We were driving rapidly on a thirty-mile circuit at the time through a fairly well settled country, and where one or another of the ladies was entirely familiar with the people of the gardens we passed, knew their exact circumstances, and frequently gave these circumstances to the budding leaves of the roadside with a fulness of detail that must have left a wake of burning ears behind us, but which can only be hinted at in this letter.

Condensed to a solid, from its most agreeable, effervescent and volatile state, the conversation of those women, their rattling comments upon the moving panorama sweeping by us—now sincere cabbage and potato patches at the fronts of laborers' cottages, and now less truthful though more spacious trim grass and conifer transplants of city suburbs—meant that Government begins in the Garden; or no Government, no Garden.

But in places the government was too strict—painfully obvious and exclusive; in others there was laxity, carelessness and decay. How rarely could the kind voices of these acute and womanly judges blend in murmurs of applause at the subtle art that had concealed itself in a peaceful scene of harmoniously domestic color and form, drawing upon all our sympathies and making the horses wait and walk, willing to linger in the shaded borders of a sunny rural paradise?

"I know those people well," said one of our voices; "they *are* gardeners from away back; every one of them. You send them a plant—no matter what, or at what season of the year—and in due time you will find it filling some place from which, seemingly, it could not be spared, in the exquisite order and system that begins afresh in that family with every morning of the year. They always have room in their garden for everything that is good, old or new, while to the most of the raw places we have passed nothing but insidious weeds and fungi can be added with the consent of their owners. The tree agent is a good enough providence for such."

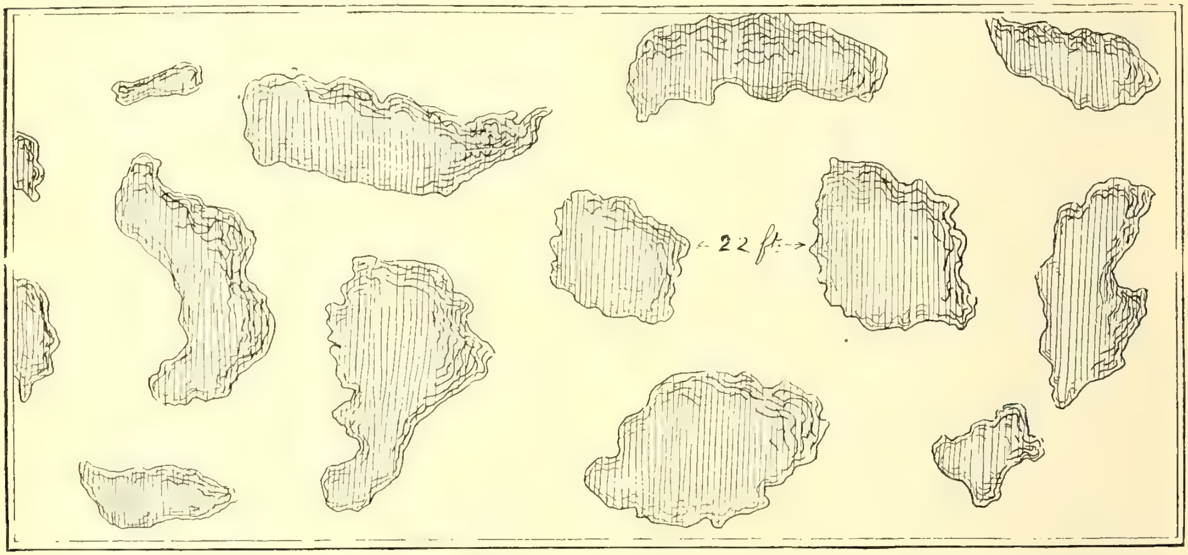
Then the voice to which I was well accustomed said: "Not till the most of these people have intermarried wisely, been born again and again, and acquired the means and the temper for industrious leisure, will they really know what gardening is." I knew without looking behind me that Mrs. Tarryer was looking away over the tree tops into the dim but hopeful future.

Our thirty-mile circuit led us through pleasant woodlands, with occasional openings of stumps and cord-wood, not too orderly in these latter day choppings, while false teachers are telling us that "even in the purest virgin soils the ground is impure." There was now and then a pond-hole with floating timber or snags, whence came spotted turtles, sunning on stumps in August, but not in early June, when we were riding. In a grassy spot, with logs to sit upon, we had luncheon, and there was an under-current of strife between those women—representing three distinct orders of family being—as to which should add to the lunch the smallest, spiciest and tenderest though crisp cucumber pickles.*

How long I had been napping on the cushions—(that carryall, by the way, was rigged *Pullmanesque*, with four distinct lodgings for grown people), and Brownie and Greysie had been nodding in their feed bags, or wondering, perhaps, when road menders would be wise enough to make as easy wheeling for a pair of horses as we find in some woodlands—before those women returned from a walk in the forest with their arms full of wild plants and their mouths full of talk concerning plans to preserve the beautiful things from such raids as they were making, and the ravages of farmers and gardeners, I have no means of knowing. For an hour after that, certainly, we were the best part of a horticultural convention on wheels, discussing the most feasible ways and means for purely wild gardens close by our doors, in good swamp style.

One of these dowagers had the best of the argument, and both of the other women finally gave in to her. She said the room occupied by some good-for-nothing apple tree was space enough for a bit of natural gardening. "Or," she went on, pointing towards an abused wood lot with a knot and a springy spot at the foot of it, "that would be a lovely place to begin one. You can buy plenty of land like that for five, ten or twenty dollars an acre, and with that properly laid out you will have cities of refuge for all the wild plants that are possible out of doors in our climate."

Then she told us how we might cut and grub around the most charmingly natural coppices, making sunny glades and fine grassy spaces, fit for anything, out of such unkempt forest as that, and she stopped the carriage while she drew this rough sketch of her plan on the bottom of a luncheon box. (See illustration accompanying.)



"There! Save every tree, shrub and herbaceous plant that you haven't too much of, and add more at your leisure," cried dowager No. 1. (I could have hugged her for her sound sense of things, and Mrs. Tarryer knew it!) "You will never tire of walking down those ever-changing and always unexpected grass aisles, brushed over occasionally with a scythe, and seeing things grow beautifully wild."

"But how about your apple tree spaces, and what will you do for anything like the water of that spring?" asked dowager No. 2.

"Well, a book of directions would not help one who has no idea of plant society, but one who studies its rules and amenities in many woods would find the drainage of her ice chest spring enough for hundred of the native orchids I have under the seat."

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* NOTE.—In a private letter Mr. Tarryer wishes me to state that "it was one of the dowagers."—ED.

"How do you determine the exact shape of those groups of trees and shrubs?"

"Cut and grub to the shape they are in now. For a new design to plant on a flat surface, toss a child's necklace on the table, or twirl a skipping rope on the floor."

"But wouldn't you need a barbed wire fence or something to keep people from overrunning your beautiful things?"

"People don't overrun beautiful, but ugly things. Make your plantations really beautiful and the common people will be as choice of them as you are."

This was a rather personal remark, for dowager No. 2, in the time of her first husband, had tried broken bottles set in cement on the top of a stone wall, without effect; but Mrs. Tarryer hastened to suggest that "a hedge fence, such as the boys used to snare partridges, or stumps and dead mossy wood might be laid around wild borders and stuffed with woods-mold, while the plants were young, to check unwary trampling; and all such designs should be carefully weeded, and planted in strict accordance with sylvan fashions."

[REMARKS BY THE EDITOR.—Mr. Tarryer mentions no names, but many favorite wild beauties will occur to the lovers who go far to seek, or pine in the absence of them. Arbutus, of course, is one his party were thinking of; also the walking fern and several other ferns, orchids, etc.; and when will our naturalist-gardeners study the habits of fringed gentian, and give the flower market all it will take? In learning to grow these three plants in profusion, a thousand wild-wood elegancies will be preserved for our use and enjoyment. Besides, this due exercise of our observing faculties would bring light into the darkest problems of our civilization.]

WINTER SPINACH.

AMONG market gardeners winter spinach is an important crop requiring careful preparation of soil, good seed, timely sowing, in a suitable place for withstanding exposure of winter. If successfully wintered it is very profitable. Spinach is used as a second crop. I plant it after early beets, early cucumbers, early cabbage, beans and early corn. The middle of August to the first of September is my range for planting the seed. After repeated trials I have chosen the Viroflay (Henderson) or the Savoy-leaved for fall sowing, and try to get the seed fresh. Ten pounds to the acre is not too much. I do not think it possible to over-feed the spinach crop with manure. The first sown seed will make spinach for fall use; or if in a favorable locality it will keep over winter. I think it is still a disputed point among our most successful gardeners whether the three-quarter or the one-quarter grown spinach is the most likely to withstand the winter. The largest grown killed last winter in some fields and lived in others. So also, the plants which only appeared above ground with two leaves in the fall came out all right in spring, as fine as the best spring sown, and two weeks earlier.

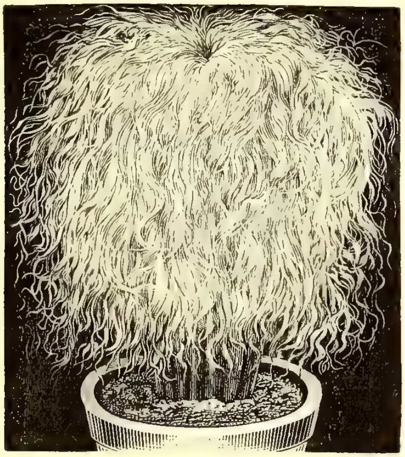

FIG. CC. CEREUS (PILOCEREUS) SENILIS. See page 460.

I have experimented with coverings of various kinds; leaves, hay, corn stalks, tomato vines, and pine bought. To place any covering is a work of time, and most cultivators seek, by planting large areas, in the most favorable spots, to secure some success in wintering without covering. The pine boughs have yielded the best shelter. Land laid out in beds four feet wide, with a deep furrow between, affords good surface drainage. The lightest lands, those earliest and driest in spring, are the best.

I have seen a slight depression in an area otherwise well drained holding water to the depth of two inches, and the spinach was killed. Frequent freezings and thawings do not seem to damage the plant as a cold water bath does in winter. The Prickly-seeded spinach is recommended for winter, but I always plant the Round-seeded. It passes through the seed drill much better and is as sure to live over winter as any.

The past two seasons have been unusually favorable for wintering spinach in this locality, for though the land has not been covered with snow, there have been also times when the frost has left the soil, allowing the spinach to grow in winter. We are still at a loss to know how to keep fall spinach that is large enough to market when winter sets in and snow falls. We have tried cutting and spreading, and partly drying, but such samples rot; storing in a dark cool cellar with the same result, the leaves turning yellow in two weeks; cutting into barrels and freezing till wanted, but this did not work. Two weeks is the limit of its life after cutting.

The cost of preparing the land in favorable weather is little, and the cost of the seed in bulk being about fifteen cents a pound, the whole cost of preparing and sowing an acre need not exceed five dollars. Planted in freshly plowed and damp soil, it comes up at once. Dry weather is almost fatal to the seed, and if sown then it should be tread down in the rows with the feet. One of my neighbors will not plant before a hard shower, or long rain, as he thinks the seed will not come up. I have not verified this. Here we practice drill sowing, not broadcasting. It should be hoed in fall to keep down the weeds which will start if the land is in good heart—and spinach should be sown on no other soil.

Hampden Co., Mass W. H. Bull.

SEED WARRANTY.

THE liability of seedsmen for losses that may occur from seeds sold that fail to germinate, or to produce such results as the purchaser had a right to expect, or had hoped to reap, is a subject of vital importance to the seedsman, and of no small importance to the purchaser. In all mercantile transactions, in fact in every instance of purchase and sale, it is expected that the article sold shall be as represented, and that the purchaser has a just claim for such damage or loss as he may sustain in case the goods are not as represented. In most instances, there is but little chance of mistake, as the goods show plainly what they are, and the purchaser pays but little attention to representations, he being his own judge.

He who buys seeds, plants or trees cannot use his own judgement in the matter, and must depend entirely upon the dealer, other than to express a choice as to variety. There is nothing in the external appearance of the seed or the tree that in any way indicates the production, consequently there is no alternative; he must depend upon the dealer, and, in so doing he naturally feels himself entitled to the same warranty he would be compelled to give if he were selling a cow or a horse, and that the dealer would be just as responsible in case the seeds were not as represented. This is a very natural conclusion for those unacquainted with seed growing to reach, as they cannot see why the law of warranty should not apply to all alike; it is, however, a conclusion that does the seedsman great injustice, and at times great injury.

No class of business men are more anxious about the goods they sell than the seedsmen. Upon the reliability of the seeds he sells rests his success or failure. The seedsman who has the confidence of the market gardener and florist is sure to succeed; this confidence can only be secured by having the seeds he sells produce the results the buyer anticipates, from the descriptions given in the catalogues. This in a general way, is a difficult matter, as a large proportion of the growers are not sufficiently acquainted with the cultivation and requirements of the variety to produce the results that have been obtained by high and systematic cultivation. It must be understood that this applies to new varieties more particularly than to standard sorts, and new varieties are almost invariably the results of selection combined with high cultivation. It is no secret that the size and shape, as well as the yield of a given variety, is proportionate to the conditions of growth. Now, when a given potato is said to yield five hundred bushels to the acre, when a squash will weigh three hundred pounds, tomatoes give eight hundred bushels to the acre, all smooth and large, and egg-plants have fruits weighing from seven to ten pounds each, it should be understood that these are only capabilities, results that have been obtained, and can be again, under the same conditions. The average purchaser of these wonderful varieties will not approximate these results.

It should go without saying, that many soils are not by nature adapted to the growth of many varieties, and will not under any circumstance yield the enormous crops that other soils will do without special effort. We have known the seedsman very unjustly blamed for this condition. Not long since our attention was called to a pea crop, by a market gardener, who complained that his peas were full of "runners." Upon inspection, we found that they were planted on a very poor soil, and had received about the same attention; stable manure, quite fresh, had been used, and this put on very unevenly, in some places quite thick, in others none at all. The result was, where the plants had plenty of food, they grew tall and vigorous; in other places they were dwarf and unproductive; the tall ones he called "runners." It was with much difficulty that we convinced him that the tall growths were genuine and the dwarf ones were simply starved. The seedsman has such occurrances constantly brought before him, and not unfrequently with a demand for damages.

From long experience and close observation, we are convinced that there is not one case in a hundred where complaint is made that the seedsman is in the least to blame for the failure of crops, or in any way responsible for the loss. Conditions of growth are varied, and it is upon these that success or failure, in a great measure, depends. The extremes of heat and moisture are prominent among the causes of failure.

We do not think there is a class other than seedsmen that has half so many obstacles to contend with, or one more willing to assume the responsibility of losses, that are justly attributable to them. Seed Grower.

PROTECTION TO THE ORIGINATOR OF VARIETIES.

CONTROL of new varieties by the originator has been a prolific source of discussion for a few years. Inventors are protected by patents and authors by copyrights; should not originators of varieties of plants be similarly protected? The question seems, at first to admit of but an affirmative answer. But there are differences between plants and books or tools.

The earlier movement designed to protect the originator was in the direction of a patent for new varieties. This movement looked upon varieties as inventions, and for this reason possesses elements of fatal weakness. It is a fact that nearly all new varieties are mere accidents to the "originator," who either picks them up in a chance fence-row or finds them among a miscellaneous batch of seedlings. The "originator" is usually a mere "finder," and he may as well claim a patent for the invention of a white raspberry or double hepatica which he may find in the woods, as upon a new peach found in his hedge-row. When the time comes that men breed plants upon definite laws, and produce new and valuable kinds with the certainty and forethought with which the inventor constructs a new machine, or an author writes a book, plant patents may possibly become practicable.

It is true, however, that the original proprietor of a new variety should be in some manner protected. One of the most important steps yet taken in this direction is the proposition to devise a national register of plants. This scheme originated with A. L. Bancroft, of San Francisco, and it has been adopted and advertised, together with a plan of propagation rights, by a joint committee of the California Horticultural and Floral societies. Essentially the same idea has been put into form by the present writer, and lists have been published which may "serve the purpose of the certificates issued for new varieties by the Royal Horticultural Society in England, and by similar organizations in other countries." Mr. Bancroft's plan of registration appears to be too heavy and cumbersome; and the same may be said of the proposed federal law to secure a propagation right to the originator or introducer.

The proposed legislation to protect plantsmen and growers possesses the fault of all attempts yet made to secure protection for the originator—the absolute impossibility of determining what a variety is and if it is entitled to be styled a novelty. There are hundreds of varieties now upon the market upon which no body of judges, even if expert horticulturists, could agree as to their distinctness from older sorts. A character which is regarded as worthy varietal recognition by one man is disregarded by another. In one soil, or under one treatment, a plant may be very different from one of the same stock grown under other conditions. Some contend that, among fruits, a seedling is always a distinct variety, no matter if its characters are identical with those of an older sort. This opinion is vehemently maintained by one of the earlier agitators for plant patents. But even if this position is correct, there are hundreds of instances in which the origin is wholly unknown, and which cannot, therefore, be brought as testimony. In fact, there are scarcely any two horticulturists who hold the same views regarding the limitations of varieties; and it is a fact that the limits constantly become more obscure the longer one studies varieties, a fact which the horticulturists of the experiment stations are rapidly learning. If this is true of men in the business, what can we expect of others who might be called to judge if varieties are infringements? It is extremely doubtful if Congress could ever be persuaded to pass such a law. To this objection some have replied that there is also great difficulty in determining merits of new machines, but the patent law is not invalidated for that fact. But this statement does not satisfy the question. A machine is the same in Maine and California, while a variety may be different on adjacent farms.

It is possible, it seems to me, to secure protection under existing laws if the registration of varieties is once secured. Trade-marks, trade-names, and brands are now protected. The name of a variety, once used in trade or admitted in a national register, becomes a trade-mark, with inviolable rights. This name could not be used to designate other varieties, and so long as the variety could not be admitted to the register under any other name, the originator would be tolerably secure.

This might not prevent the re-naming of the variety by obscure persons, in defiance of the national register, but those who steal varieties need also to steal the best known name as an advertisement. If this scheme would not entirely overcome risks, it would at least reduce them to a minimum and would result in as thorough protection as could possibly be secured by any special law. An organized effort strong enough to effect a registration of plants would find little difficulty in discovering tricksters. The originator should secure a certificate of registration, and the public would very soon learn to buy only of those who hold one. Sale of the right to use the name or trade-mark should be recorded at the office of registration, so that all stock could be traced to its source. This is an imitation of the registration of domestic animals. There is no law to compel one to register an animal, but every breeder knows that it is only through registration that he can advertise, sell and protect blooded stock. And there is no intelligent purchaser who would think of negotiating for such stock without having obtained the testimony of the herd-book.

To be sure, this plan would not remove the difficulties concerning the limitations of varieties, but it would place the definition of varieties upon the experts in charge of the national register, rather than carry it into court. In fact, it would prevent all litigation, for all varieties admitted to the register would be legitimate, and for all others protection could not be expected.

The solution of the whole matter is exceedingly simple. Let a register of cultivated plants be instituted at the Department of Agriculture. Then let the originator send to the Department a specimen, description and, perhaps, picture of his novelty; if the variety appears to be a new one, a certificate of registration is issued for it. If the originator chooses to sell his stock to dealers, let the fact be recorded, and a record of transfer be issued to the purchaser. If the originator desires to control the propagation of the variety, he can do so for any length of time by specifications in his contracts with dealers. It is evident that after a variety is put upon the retail trade, it becomes public property, and no statute could further protect it. When a man buys for the purpose of planting, he buys also the privilege of selling the fruit or other commercial portion, and this portion is often the very one used for propagation of the particular variety. No law could prevent the propagation of melons and most other vegetables when the varieties are put upon the market, even were there no "common rights" at issue.

An eastern nurseryman has already secured a copyright upon the name of a new grape. With the aid of a register to record his variety and others, he would be practically secure. In fact, he finds himself secure even now. The register, as we have suggested it, is not a burdensome affair, although objection has been raised to registration for the very reason that it would entail so much expense. A list of American kitchen-garden vegetables, comprising 2,696 entries, is made by a private individual in the "Annals of Horticulture," and the greater part of the work lay in revising the names. And the same volume makes a catalogue of the introductions of 1889, which is certainly very nearly complete, comprising 444 entries. These lists are the first attempts yet made toward a registration of plants. If the fuller register is ever made by the Department of Agriculture, descriptions will have to be added, but one clerk could perform all the labor required after existing varieties were entered.

All this needs no memorial to Congress, no great machinery, no new law. It is in every way feasible and practicable, and no doubt a mere petition to the Secretary of Agriculture by the leading horticultural organizations would effect its execution. On the other hand, it is probable that Congress would never pass the laws proposed. If they should exist, they could never be enforced, and they would be so cumbersome, circuitous and tedious as to fall of their own weight; and it should be borne in mind that all special protection is likely to increase prices to such an extent as to greatly lessen its sale or to impose unnecessary burdens upon the planter.

L. H. BAILEY.

* * *

A mere relator of matters of fact is fit only
for an evidence in a court of justice.

—SHENSTONE.

The Editor's Outlook.

CACTUSES IN PLACE AND OUT OF PLACE.

THE cactus is a curiosity, one of the wonders of the vegetable kingdom. It is unusual, and therefore always bold and striking. For this reason it is a favorite with many as an object of ornamentation in lawns, and the species are often used in composition for landscape effect. In fact, so common is this use of cactuses that we may take them to represent a type of ornamentation which is characterized by obtrusiveness and uncommonness. This is almost universally the form adopted by those who have a shallow love of nature. It indicates that the designer is less in sympathy with his surroundings than with other regions, and that his desires are to be satisfied only by something which appeals at once to the eye as peculiar. Such types of gardens are common. One frequently sees glaring curves, angular banks, balanced figures, piles of stones, curiosities and abundance of abnormal and unusual trees and plants, but he rarely finds a picture painted in a landscape with the same taste that the artist defines and composes on his canvas. And even when we do find a garden created in the love and appreciation of nature we are too apt to pass it by as tame or commonplace.

It is apparent that if cacti are to be used in landscape work, they must be treated wholly as accessories are treated, in the same manner as we treat a rockery or anything which is out of keeping with the general spirit of the scene. They should be inconspicuous, unless perhaps near a greenhouse or in restricted areas devoted to rarities and curiosities. In this climate they should never form an integral part of the landscape, for they never combine well with greensward and trees; or if they are used in the more natural portions of the grounds, they should always be partially concealed.

But we are not to be understood as discouraging the cultivation of cactuses. We are only protesting against the grossness of fashion and taste which is too often confounded with landscape gardening. Fashion often springs from an inharmony with nature, while landscape gardening is always inspired by the genius of contiguous landscapes. As greenhouse plants, cactuses possess many merits, and are eminently worth much more general cultivation. They possess, in a remarkable degree, curiousness and beauty, and they present an almost endless variety of forms and peculiarities. They afford innumerable surprises. Probably nearly, if not quite all the species, will some day find their way into cultivation. They are mostly easy of management, and they take kindly to adverse conditions. Many of the species hybridize freely, and they can be grafted with the greatest ease. They also vary widely under cultivation into the most grotesque forms. This variation is largely in the direction of fasciation or the flattening or coxcombing of the parts. The peculiarities of shape and form, combined with the great beauty of their flowers are the very features which tend to make them common favorites for lawn decoration. But everything must have its place, and it should be borne in mind that cactuses are valuable as cactuses, not as elements in the landscapes of our climates.

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BOTANY AND HORTICULTURE.

"SOME Relations of Botany to Horticulture!" It is strange that in these days any one should fail to see the relations of botany to horticulture, strange that any apology is necessary that the gardener should know plants. We do not question the necessity of physiology to the physician, nor of theology to the preacher, yet there are those in high position who would discourage the knowledge of plants for the plantsman! One cannot define horticulture, nor any branch of it, without speaking of plants. Plants are the essence of it, and botany is but the classified knowledge of them. To know botany, then, is to know the fundamental principles of horticulture. To be sure, one can grow plants without knowing much about them. Parrots learn to talk without knowing the meaning of words. But a horticulturist should be more than a parrot.

We do not care to enlarge upon the various details in which botany aids the horticulturist, else we cheapen botany and horticulture alike. We stand for the broader life which botany must bring to every one who stirs the soil. We stand for its educational influences, its inspirations, its emotions, and its poetry. No horticulturist can rise to eminence without a symmetrical knowledge of botany. He cannot build a fire without fuel. He never scans the horizon. He never looks over the garden fence. He works in a treadmill.

The more one knows of his subject and its correlatives, the broader his ideas. A constricted horizon means constricted thought and methods of work. It means a life spent upon incidentals, while some of it, at least, ought to be spent upon principles. It means mere testing of varieties and cutting of seed-potatoes. We wish that every agricultural college and experiment station in the land had Professor Beal's words painted on the gate-posts: "No horticulturist without a thorough knowledge of the principles of several departments of botany is capable of planning and conducting and interpreting experiments."

Horticulture can never rise to the dignity of a polite art, nor to the position of a science, so long as it smothers itself in ignorance. Men do not rise above their aspirations. Horticulture is intrinsically a noble profession, and as soon as it is freed from narrowness and bigotry, it will assert itself. All education must come to its aid, but botany must come first and be foremost. "It will make him a good observer, improve his reason, strengthen his judgment, cultivate his taste, broaden his views, weaken his respect for the traditions of his fathers. It will sharpen his wits, make him a reliable investigator. It will enable him to become a leader instead of a follower."

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A NEW CHARM FOR COUNTRY LIFE.

"GOD made the country." Men will some day learn the truth of this aphorism. They will learn also to combine with it the thought that broad fields, sunshine, the rains and the dews, are in no way incompatible with a high life and social culture. So we regard every movement looking in this direction as an evolution in civilization. The latest proposition for the socializing of the country comes from California, and it is known as the "ten-block system" of numbering land and houses. "The system is to divide each mile along the roads into ten equal parts, or imaginary blocks, of 528 feet, 176 yards, or 8 chains each, and assign to each block two numbers, one on each side of the road. Any and every house located within a block is given the number of the block. The first one—and in nearly every case it will be the only one in the block—has simply the number; the second one has the same number, followed by the letter A; the third by the letter B; the fourth by C, and so on—Nos. 196, 196A, 196B, 196C, etc. If there is no house in the block, the number is assigned to it just the same, and it remains in readiness should a house be built at a future time."

The further details of the system are few, but we cannot present them here. This is the first practicable attempt yet made, so far as we are aware, to know and record the inhabitants of the country. The movement is spreading in the Golden State, and it ought to spread in every township in the land. The advantages it presents are numerous and important. The traveler could instantly compute distances and acquire directions. The numbers on the gate-posts or over the doors would be milestones. Country directories could be published. But above all, it would quicken communication and intercourse in the country. It would be a powerful civilizer.

To make this feasible, a system of naming country roads must be inaugurated, and this, too, our California friends are perfecting. In Contra Costa county, lying against San Francisco, are such charming bits as the following: Contra Costa Highway, running through the county and striking the county seat; Rio Vista, Mountain Drive, Willow Pass Road, Golden Gate Way, Lime Ridge Crossing, Stanley Road, and the like. We know of nothing so good as this since the efforts of dear old Jacob Bigelow in naming the walks and drives of Mt. Auburn.

All this could add much charm to the country, for it would personify nature, commemorate events, and localize sentiments. The ten-block system idea originated with A. L. Bancroft, of San Francisco, who has large orchards in Contra Costa county. He wondered why the country in these respects could not pattern after the city. Now we are wondering why we had not thought of it ourselves—but this is always the way with good thoughts!

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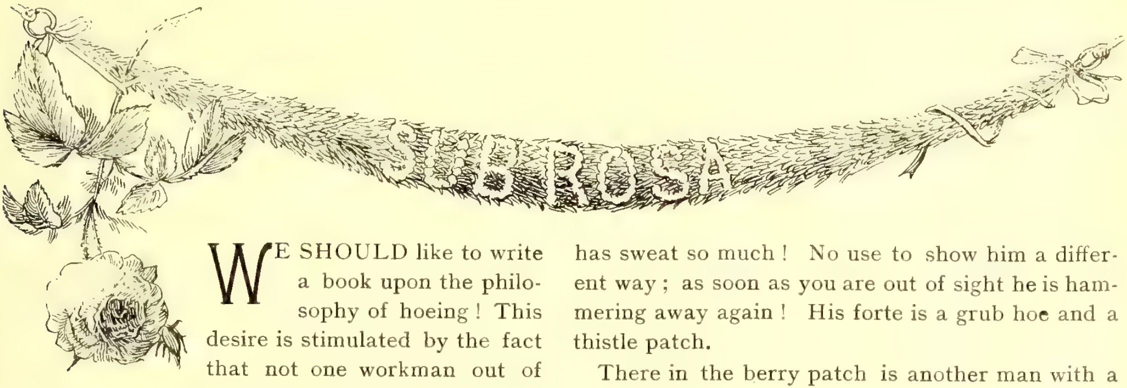
PROTECTION TO PLANTSMEN.

THE most important discussion now before the horticulturists of the country is the agitation looking toward the protection of originators or owners of new varieties of plants. This agitation is by no means a new one. A number of years ago Jacob Moore, of Attica, N. Y., printed and distributed a circular calling for a "plant patent." Mr. Moore introduced the question before various horticultural organizations, and his plans were considerably discussed by the press. Early this year the question was revived by A. L. Bancroft, of San Francisco, and the California horticultural and floral societies took the matter up, and a committee from those organizations now has it in charge. Mr. Bancroft's idea of protection, or propagation-right, as outlined in the committee's circular, is not very different from Mr. Moore's. Neither of the parties, so far as we know, have drawn up specific bills for presentation to Congress. In the meantime, The Rural Publishing Company had the matter under advisement, and it drew up a definite plan in the form of a bill. This plan adds features which have not been made sufficiently prominent before, particularly the official enlistment of the experiment stations in the work. A California contemporary has charged us with plagiarism, but our plan is an entirely independent and original one. It is the out growth, as is probably the California scheme as well, of the older agitations upon this subject. If it is necessary that Congress should enact a law to protect plantsmen, we submit our outline as the most practicable one which has yet been given to the public. But we do not wish to press our measure at the expense of others. We understand that united action is necessary in order to carry any measure, and we are willing to add our influence to the best venture, wherever it originates.

Others look upon Congressional enactment as unnecessary and superfluous, and build their faith upon the protection accorded to trade-marks. The first definite and public elucidation of this idea appears elsewhere in this issue. (See page 481.)

In connection with the protection idea, there has lately arisen a scheme to make a general register of plants, not unlike the herd-books in principle. This is the redeeming feature of Mr. Bancroft's scheme, and we have copied it into our own measure. Mr. Bancroft's proposition is too heavy to be practicable, however, but this fault will no doubt be corrected by those who have it in charge. An independent plan of registration has been undertaken by Professor Bailey in his "Annals of Horticulture." This undertaking was wrought out last year, and the manuscript of it was in the printer's hands long before the western scheme had been given to the world. It is the first actual result which has yet been reached looking towards the protection of plantsmen. This looks toward a registration which shall include the nation, and it was undertaken because there seemed no other way. But Mr. Bancroft's scheme is perhaps bolder, and if it could be carried out, would be better.

Out of the various ideas which will be presented, a practicable venture must arise; with the best one we shall cast our lot.



SUB ROSA

WE SHOULD like to write a book upon the philosophy of hoeing! This desire is stimulated by the fact that not one workman out of ten knows how to hoe; and perhaps this statement would fit gardeners themselves as well. The very first requisite to good hoeing is an adequate knowledge of why we hoe. Over in the pumpkin field a man is hoeing now—or chopping rather—who has thrown off his hat, unbuttoned his shirt, rolled up his sleeves, and who is sweating like a water-cooler in a "muggy" day. At every clip he raises his hoe nearly to the top of his head, and he brings it down with a whiz, regardless of stones and almost regardless of place. The first half day he shivered up his hoe blade. This man believes in muscle in hoeing, if he believes in anything at all. He chops here and there, and leaves the ground lumpy and uneven. He always winds up his day's work with the feeling that he has earned his money because he has sweat so much! No use to show him a different way; as soon as you are out of sight he is hammering away again! His forte is a grub hoe and a thistle patch.

There in the berry patch is another man with a hoe. He has weeds in his eye, and his hoe never touches the ground where there are no weeds. This is the most fatal of all mistakes, for it indicates that the man has not conceived of the very first principles of hoeing. However ignorant our ancestors may have been—and our neighbors still are!—a man should know that wherever good work is expected hoeing means cultivating, not only weed-killing. So, after every weed is taken out of our berry patch we shall still need to *hoe* it.

Among the egg-plants is still another man with a hoe. He works easily and appears to do his work well. But watch him an instant. He skims the surface just as our mothers used to skim milk. He catches every weed and tickles the entire surface of the ground, but he is not hoeing—he is simply scraping. That clay is just as hard as it was before he touched it with his scraper.

So here are three types of hoe-users—the chopper, the weed-hunter and the scraper. They all work faithfully and do not earn fifty cents a day. What is hoeing? That is easier asked than answered. Let a man get a deep conception that hoeing means pulverization, with such incidental advantages as weed-killing, leveling, smoothing and the like, and let him come into the feeling that it is not mere drudgery, and he soon learns how to hoe. Nor do we think this latter attribute an unimportant one. Just in proportion as a man looks upon his work as drudgery, does it deteriorate in value. It lacks spirit and intelligence. What a pleasure it is to loosen up the soil! How the plants love it! How the air penetrates the loose mold! How all nature smiles upon you as a helpmeet and gives you a double reward! And the fields and the winds and the loves of plants and birds are yours!

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LUGUBRIUS, our neighbor across the way, to whom we read this last burst of emotion, shrugged his shoulders and said: "That's all very well for you fine chaps, but by the time you peg away all day I guess you will think otherwise. I can't see any fun in hoeing." To this astute remark we could only reply by saying that we get tired of pic-nics and fire-crackers, and that the man who can see some fun in hoeing has the advantage. "That will do very well to talk about," he retorted, "but if you had to keep up your row all day, I guess you would be tired at night." Now this is just the remark which we wanted him to make. Have we not been obliged to keep up our row in many hot and dusty days when every clod burned our bare feet? And do we not remember how the boss used to call out, "Come, Bub, come along; keep up your row?" And have we not gone home at noon and night too tired to eat, too tired even to throw stones at the squirrels in the old log fence? But why should a man become a pessimist simply because he has to labor and gets tired? It does one good to get tired. The man who never gets tired never accomplishes enough to pay for living. It is not the tiresomeness but the thoughtlessness which snatches away the happiness. How many of us work in a tread mill all day, or pull the sweep of a brick mill, not thinking that we can do or think anything else! Put life into the hoe, put determination into it, put thoughtfulness into it—then tell us next year if hoeing has not become easier to you! You will see what it is to hoe "in the spirit," and to live.

BUT there are some people who try to put too much thought into their hoeing, or they put in the wrong kind of thought. These peo- catch old thoughts with their fingers and crowd them into their brains, and when they pull them out again they call them original! Biblius, our next door neighbor, is one of these men. He cannot cut off a daisy without calling out *Chrysanthemum Leucanthemum!* During all the day he is full of metaphors and Latin names and scientific digressions. Now, Philip, our gardener, takes a great delight in making sly remarks about Biblius' hoeing. When we had been away a few days and wrote to Philip we got a characteristic reply, and we knew that he had just been looking over the fence into Biblius' geranium bed.

"Writing and talking are not in my line," he wrote; "and perhaps it is just as well, for I might then feel that I could write and some one else should work. I would then call the potato *Solanum tuberosum* and the carnation *Dianthus Caryophyllus;* but I prefer a well grown potato of good flavor when cooked, and a large good-shaped carnation. I would then belong to a class who seem to have a monopoly of all the ideas about gardening. Nor do I belong to the artistic or romantic class of gardeners. I will not promise you great things in the grand future. I would rather prove as I go along."

Now, all this pleased us greatly. It somehow seems to us that Philip thinks more than Biblius does after all. Philip knows big Latin names, but he does not hoe with them.

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THE Society of American Florists meets late in this month in Boston. If there is any industry nearer heaven than another, it must be the florists'. A man who is always with flowers and who knows them intimately ought to be the sunniest and best of men. So we shall count upon being in Boston. We have met before with the florists, butwe have been disappointed. We found ourselves in sympathetic company, after a fashion, for we were "hale fellows well met." Members went to the convention hall, sometimes—the faithful few went always—but the majority oftener went elsewhere. We found the convention an unwieldy mass, prone to clap-trap. The "excursions" have sometimes been disgraceful. Who recalls with pleasure a certain junketing up theHudson?

Our heart is in this society, for we love all that it legitimately represents and we admire many of its men; but let us purify it, give it definiteness, straightforwardness and dignity. Its work is too noble to be slighted.

FIRST FRUITS

⁂ *The cactus overflow of this issue will find a place in the September number. Among other interesting matter, A. Blanc, of Philadelphia, the largest cactus grower in the world, will contribute an article which will give special attention to variation of cactuses under culture. The strawberry reports of the season will also be full, and an especial feature will be a discussion on the present merits of the Wilson strawberry. An unusually interesting illustrated leader will talk about farming and gardening in 1840 and 1890.*

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THE importation of "castaneas" or Brazil nuts has been light this year owing to a short crop.

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THE continued late rains in Florida are improving orange crop prospects.

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THE acreage devoted to melons in Missouri is said to be somewhat less than last year.

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HOT and heavy winds have seriously damaged the lemon crop of Sicily.

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THE March freeze in the South not only destroyed fruit buds, but it seriously injured trees in many places.

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THE first shipment of deciduous-leaved fruit from California to the east this year was a car-load of Black Tartarian cherries sent on May 17th from Sacramento to Chicago.

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A CHICAGO firm has recently contracted for the entire crop of fruit on the famous Ranco Chicho in California, owned by General Bidwell. There are about 200 acres of grapes and 1,250 of orchards.

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CAPTAIN JOHN DONNEL SMITH, of Baltimore, who has explored Guatemala in the interest of botanical science, declares that the regions between Guatemala and Mexico are probably the least explored of any on the North American continent.

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THE Illinois State Horticultural Society holds its next annual meeting at Cairo in December, opening on the 9th. The Ohio and Mississippi Valley Horticultural Society holds its annual meeting on the preceding day in the same place.

WHILE there is a much larger acreage of tomatoes in Southern Illinois than was ever grown before, the vines are not well set to fruit. Early varieties are ripening and a few Acmes are ready for market. A strike on the Illinois Central railroad, however, completely shut us out of the market for a time.—*Fruit-Growers' Journal.*

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THE INCREASE of the exportation of apples from Nova Scotia to England is something quite remarkable. According to Mr. Johnson, statistician of the Dominion of Canada, this export, which in 1868 was but $44,000, reached in 1888, $700,000. At the same time the increase in the quantity of apples annually sent to the United States was from $35,000 to $400,000.

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THE EXTENSION of grape growing in Canada is quite remarkable. Not only in Ontario, but down the St. Lawrence river on both banks, as far as Montreal, and below, grape-growing as a business is extending itself, and fruit is being produced which is preferred to that brought from the southward. It is a fact that on the upper St. Lawrence and about the north end of Lake Champlain, better grapes are produced, and the fruit is a surer crop, than in western Massachusetts.

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THE AMERICAN SEED TRADE ASSOCIATION met at Saratoga Springs, June 10th and 11th. Eighteen states were represented among the delegates. A committee was appointed to visit Washington in the interest of the tariff on seeds and supplies, and another to take into consideration the matter of a horticultural exhibition at the World's Fair. The following are the officers for the eusuing year: Albert McCullough, Cincinnati, president; W. A. Burpee, Philadelphia, vice president; Z. DeForest Ely, Philadelphia, second vice president; John Fottler, Boston, secretary and treasurer; W. W. Rawson, Boston, assistant secretary; H. W. Johnson, William Meggat, J. C. Vaughan, J. H. Allen and T. W. Wood, executive committee.

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THE PRESENT census enumeration is particularly complete in agricultural and horticultural matters. Some topics of horticultural interest are to be made the subject of special reports, but the general schedules contain the following questions, which have been asked of every commercial grower before this time, but which are equally interesting to all others; *Onions:* Field crop —number of acres, bushels produced and sold, and value. *Potatoes:* Sweet and Irish, bushels produced and sold. *Market gardens and small fruits:* Number of acres in vegetables, blackberries, cranberries, raspberries, strawberries and other small fruits, and total value of products in 1889. *Vegetables and fruits for canning:* Number of acres and products, in bushels, of peas and beans, green corn, tomatoes, other vegetables and fruits. *Orchards:* Apples, apricots, cherries, peaches, pears, plums and prunes, and other orchard fruits; in each the number of acres, crop in 1889, number of bearing trees, number of young trees not bearing, and value of all orchard products sold. *Vineyards:* Number of acres in vines bearing and in young vines not bearing; products of grapes and raisins, and value in 1889.

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NEW AGRICULTURAL COLLEGES.—The Clemson Agricultural college is founded by the bequest of Thomas G. Clemson, son-in-law of John C. Calhoun, and is to be established at Fort Hill, South Carolina, the home of the great statesman. The original gift was $100,000 and the estate. The state has supplemented the bequest by $15,000 appropriated for buildings and some other purposes, and the Hatch fund of $15,000 has been transferred to it from the State University. The fertilizer tax is also transferred to it.

The New Mexico Agricultural college has been organized recently. Hiram Hadley is president and director of the experiment station, and A. E. Blount, late of the Colorado Agricultural college, has charge of agriculture and horticulture.

The Utah Agricultural college is located at Logan City. It is just getting under way. Professor J. W. Sanborn, formerly of the Missouri State University, is is president and director of the station. The horticulture is in charge of E. S. Richman, formerly of the Arkansas Industrial University, and W. P. Cutter, from Cornell, takes the chemistry.

North Dakota has recently established an agricultural college and expriment station.

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NURSERYMEN'S ASSOCIATION.—(Continued from last month).—George W. Campbell speaking of grapes strongly favored the Woodruff Red. He thought it the best red grape yet introduced for general planting, although the quality is not high. "Success in grape culture," said Mr. Campbell, "requires that a variety be selected which is adapted to the locality in which it is desired to plant: the area of adaptation is much wider for some varieties than others.

"I have hopes that with the use of the sulphate of copper solutions the Delaware grape may be grown successfully over a larger section of the country than even the Concord.

"I believe the general adoption and use of the new fungicides and insecticides recently introduced will enable us to grow many of the best varieties where it is now impossible so to do."

It was asked if any member could recommend a variety of grape to plant with the Brighton for the purpose of fertilization. Mr. Hale, of Connecticut, has Brighton planted with a row of Lady on one side and a mixed row of Concord and Moore's Early on the other. His crop of Brightons is sure and unusually good in quality and bunch.

A member remarked that the Iowa Experiment Station had proven that the Rogers hybrids do better when planted close by Concords, than alone or near any other sort.

F. W. Kelsey, of New York, in his paper on transplanting evergreens urged that they be several times transplanted in the nursery. He held that the universal successful transplanting of evergreens in Europe was because of this precaution.

J. W. Manning agreed with the speaker, and it was his practice to transplant evergreens in the nursery every two or three years. A customer of his carted 582 trees 20 miles from the nursery and lost but 26 trees in planting. This good result Mr. Manning thought was due to the frequent transplanting the trees had had in the nursery.

J. H. Hale, of Connecticut, talked about his success in peach culture. It was due, he said, to the proper selection of soil and locality, liberal feeding and constant care, to the pruning of the trees and the judicious thinning of the crop. The fruit was carefully picked, closely assorted, four grades being made, and honestly and attractively packed.

J. W. Manning, Jr., urged the importance of hardy perrenials in the nursery. The planting public is becoming familiar with the beauty and value of this class of plants, and the nurserymen must be prepared to supply the demand.

B. E. Fernow, chief of the Forestry Division of the Department of Agriculture, discussed the forestry problem in its relation to nurserymen. In the discussion which followed the speaker alluded to the disposition now prevalent to plant black walnut trees for profit. He urged that too much store be not placed on this tree for profit, as only for the first 15 or 20 years is it a fast grower. After that its growth is slow and its value comes chiefly with age.

Regarding the best forest tree for general planting, Mr. Carpenter, of Nebraska, said that the black walnut was one of the most valuable for general planting for small plantations. In the west the black locust and catalpa were the most valuable, but a judicious mixture of the three would be the best.

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PATRICK BARRY.—Early on the morning of June 23, Patrick Barry, the great horticulturist, passed peacefully away at his home, in the presence of his entire family.

It is impossible to do full justice to the life and work of Mr. Barry. He was born in Ireland, near the city of Belfast, in 1816. After receiving a liberal education, he emigrated to this country at the age of twenty years. Entering the employ of the Princes, of Flushing, Long Island, as a clerk, he devoted his time and energies to his chosen occupation, and in the remarkably short space of four years had acquired a very thorough knowledge of the nursery business as it then existed.

In 1840 he moved to Rochester, N. Y., where he formed a partnership with George Ellwanger. The young firm started business with seven acres of land, known as the Mount Hope nurseries, and now of world-wide reputation. The young horticulturists of to-day find themselves the possessors of an inheritance secured to them through the privations and vexations of years of patient and persistent effort by the firm with which the late Mr. Barry was identified.

In those early days these pioneers found themselves in a new country, possessing no collections of fruit, with no telegraphic or cable facilities, with no railroads or fast ocean steamers, and separated from the Old World by a distance which then required almost as many weeks to traverse as days now suffice. Necessarily, therefore, many weeks and months were spent in the effort to procure new stocks, both in Germany and France, which, when gathered, were transported to the sea-ports by stage coach, and thence conveyed by sailing vessels to the New World. When the young firm started to budding trees they were sneered at, and called fools and lunatics for their pains. Such were some of the difficulties encountered by these men in the efforts to introduce new stocks into this country. But they persevered, and Mr. Barry was identified with the growth of horticulture to the present time, having succeeded in giving to the American people the most desirable plants that can be successfully grown upon its soil. Every new apple and pear was imported from abroad and tested, in order to determine its quality and adaptability to the climate, before it was placed upon the market. It is safe to say that no other nursery firm in the country pursued such a course; nor, indeed, is it now so necessary, since the United States government and individual states, as well as some colleges, have established experimental stations for the purpose of continuing just such work as the firm of Ellwanger & Barry inaugurated forty years ago.

Mr. Barry occupied numerous positions of prominence and trust in the state and in the "Flower City," and was identified with many enterprises which have helped to make Rochester the prosperous city it now is. For more than thirty years he was the president, and a most liberal patron of the Western New York Horticultural Society, and in his last communication to that body, at its annual meeting in January last, he thus expressed himself: "And now a word as to the presidency. You have given me this post of honor for a very long period of years—I am no longer able to perform its duties, and lay it down with profound gratitude, and with an affectionate regard for the society and every individual member." But the assembled horticulturalists with one voice declared that so long as Patrick Barry was able to write "yours truly," so long he should be continued as their president.

In an editorial, a Rochester paper thus referred to Mr. Barry: "He was a man of exceptionally strong character. The slightest contact with him elicited some manifestation of personal power. He was straightforward in his methods, honorable in his purposes, and of an integrity that would not tolerate even the suspicion of indiscretion. In private and public affairs he was a stern, aggressive personality whose influence went always for what was honest, genuine, and true; and in his loss the community loses not simply an individual life but a moral force." And the bishop of the church with which Mr. Barry worshiped, as he stood by his casket, thus beautifully made reference to the dead horticulturist: "This man and the others associated with him raised the occupation to which they devoted their life work to the dignity of a liberal profession, not manual or clerical, but a profession that needed long years of study and careful application. By intellectual labor and by extensive reading, he contributed to make their profession worthy to be called one of the liberal professions—raising those who were engaged in it above their fellow men;" and again "he ruled in his household wisely, conscientiously, lovingly, as a man should rule in it."

Such was Patrick Barry, a man to whom every lover of horticulture owes a debt of gratitude that can best be acknowledged by constant efforts to perpetuate his example.

He leaves a widow, one daughter and three sons, "children who are doing honor" to the name they bear.—John Hall, *Secretary Western N. Y. Horticultural Society.*.

Patrick Barry has left a lasting impression upon American horticulture. This is due in part to the region and the time in which he lived, and in a much larger part to his own energies. He entered the nursery business when American horticulture was young, and when there was need of a commanding personality to make it known. Along with the Downings, Prince, Parsons and others, he was a sort of pioneer in the field. He helped to build up a great business, which was not only a commanding financial success, but also was an aid to all who undertook to grow fruits and ornamental plants. The house of Ellwanger & Barry has long been noted for its reliability, thoroughness and straightforwardness, and much of its character is due to the sterling integrity of Patrick Barry. He was also well known as a horticultural writer. In his early years his pen was prolific, especially in an editorial way. He was once editor of the famous *Horticulturist*, and later he was horticultural editor of the *Genesee Farmer*. In his later years he became widely known among pomologists from his work on the Fruit Catalogue of the American Pomological Society. This was work in a new field. But he was probably best known as the author of the *Fruit Garden*, a work which first appeared many years ago, and which in its last edition is one of our standard works upon pomology. His memory will long remain a great inspiration to horticulturists.

FOREIGN NOTES.

Mr. R. C. Affaurtit, one of the editors of the Dutch journal of gardening, *Sempervirens*, died February 1st, aged 65 years.

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Wormy Fruits.—To prevent insects from depositing their eggs upon plants when in flower, spray the latter with a solution of one part of vinegar to ten parts of water. This treatment has given excellent results at the school of arboriculture at Lyons.—*Revue de 'l Horticulture Belge.*

⁂

Hydrangea stellata fimbriata.—This variety is a new form of *H. Hortensia.* The flowers are large, and white in color except near the center, which is bright red. The umbels are 9 to 10 inches in diameter. The plant is a vigorous grower and has dark green foliage.—*Gartenflora.*

⁂

Iris reticulata.—This plant is of eastern origin, and very hardy; during such winters as that of 1889-90, the flowers appeared even during the first days of January. The plant is bulbous and dwarfish. The leaves are few in number, straight, and rather longer than the flower stalk. The flowers have a pale violet color, and are very fragrant —*Revue Horticole.*

⁂

Blond Giant Lettuce (Blonde géante). This lettuce is certainly one of the best for the summer and is fast becoming a favorite with the market gardeners at Halles. Its foliage is curled, almost golden in color. The head is high, large, and very hard. This variety resists heat well, and is slow to produce seed. It is also called Chou de Naples blonde.—*Revue Horticole.*

⁂

Pascal Celery.—The great merit of this new celery consists in the enormous thickness of its stems, which are fleshy and very tender, even when unbleached. It is medium in height, and possesses excellent keeping qualities during the winter. Where liberally treated with manure it yields tender and brittle stalks, possessing no bitter taste, and easily bleached.—*Revue Horticole.*

⁂

Long White Cucumber (Blanc long). This variety was perfected by the market gardeners of Paris; its fruit is cylindrical, smooth, and white from the time it is formed until maturity. The flesh is thick, firm, not bitter, and very pleasant to the taste. Although it does well when sown in the open ground, better results are obtained if grown in a hot bed.—*Revue Horticole.*

⁂

Warning Against American Evaporated Apples. Notice.—It has been proved by careful examination that American evaporated apples, which are so common in our markets, contain an extraordinary amount of the salts of zinc. These salts find their way into the apples during the process of evaporation, and when taken into the system, act very injuriously upon the general health. (Exposed by the Imperial Commissioner of Health, 1889.—*Garten-und Blumenzeitung.*

⁂

Obituary.—Ex-President Jules Monges, of the horticultural society of Bouches-du-Rhone, died March 3rd, aged 64 years.

Pesident M. F. Sénélar, of the horticultural society of Bouches-du-Rhone, died on the 17th of March.

Mr. A. Du Breuil, one of the most noted writers on arboriculture, has just died in his eightieth year.

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Expositions.—A horticultural exposition will be held at Meaux, from the 13th to the 15th of September.

A horticultural exposition, and the arts and industries which are connected with it, will take place at Lucon, France, on the 20th and 21st of September 1890.

The horticultural society of Lyons will hold an exposition at that place, from the 11th to 16th of September, inclusive. The exhibition will be divided into five classes; *Garden culture*, *Arboriculture*, *Viticulture*, *Floriculture and Industry.*

⁂

Importations of Bulbous Plants from Japan.—The following figures show what proportion the exportations of bulbous plants from Japan has assumed.

In the month of August, 1889, there were shipped from Yokohama to Hamburg, 232 cases; to London, 2,531 cases; to San Francisco, 17 cases; to Hong Kong, 120 cases; to Singapore, 223 cases. In September, 1889; to Hamburg, 490 cases; to London, 2,548 cases; to New York, 112 cases. to San Francisco, 439 cases; to Bombay, 61 cases.

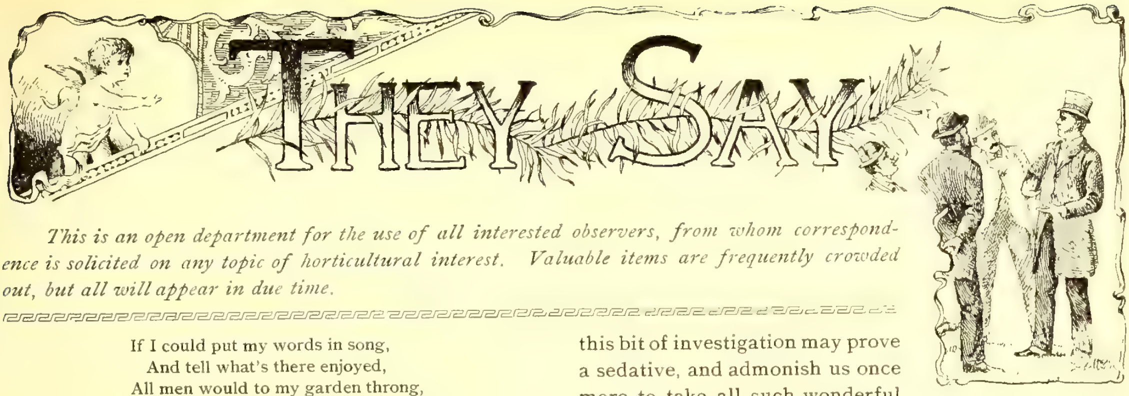
In October, one house alone shipped, among other things 419 cases of lilies.

The total number of cases shipped from Yokohama during these three months amounted to 1,192, containing about 700,000 bulbs, the greater part of which were bulbs of the *Lilium auratum.*—*Sempervirens.*

⁂

Chemical Aid to Fruit Growing.—The beneficial effect of sulphate of iron or green copperas in fruit growing has been brought before the Société Naitonale d'Horticulture de France by M. Venteclaye, who has tested its properties in a garden at Argenteuil on very meagre, chalky soil. The fruit trees, despite all his efforts, were not productive, and he conceived the idea of introducing iron into the soil. At first he tried iron water, but it was a troublesome process. Having used sulphate of iron for destroying a fly on some of his apple trees, he observed that these trees were more vigorous than the others, and therefore adopted the following treatment: Sulphate of iron is dissolved in water, and the solution, highly diluted, is applied to the soil during the month of March, and, if the trees are very poorly, again in July. Since he began this treatment the orchard has improved.—*Horticultural Times.*

THEY SAY



This is an open department for the use of all interested observers, from whom correspondence is solicited on any topic of horticultural interest. Valuable items are frequently crowded out, but all will appear in due time.

If I could put my words in song,
And tell what's there enjoyed,
All men would to my garden throng,
And leave the cities void.
—*Ralph Waldo Emerson.*

The Satsuma Orange Discussion.—I was much interested in the article headed "A Japanese Success," in the May issue of THE AMERICAN GARDEN. I recognized the reputed author as an expert in the "art preservative of all arts," but the general tone and apparent authoritative truthfulness of the article led me to suppose the writer had mastered more than one profession, and had invested his profits from one, like many another of our well-to-do citizens, in a Florida orange grove, and was merely recording the results of his experience for the benefit of his fellow men.

Of course, the precocity of the new candidate and the lucky Florida nurseryman who realized $9 a box for his Satsuma oranges (whether one box or a thousand makes no difference!), created in me a desire to get there, too; so I wrote my agent, a veteran pioneer in the business, to post him in the matter, and found he had been on the alert, having budded trees already growing, and had set more buds only the week before. He further says: "I think its reputed hardiness may make it valuable in the northern portion of the orange belt; have no trees in bearing, but a neighbor has; have sampled the fruit and did not see as it was in any way superior in quality to many other oranges. Knew Gen. Van Valkenburg quite well, and have seen the trees which he brought from Japan. Perhaps it would be a good thing to try a row of Satsumas around the margin at the homestead, in place of the lemons. This is the third time they have been cut back and very seriously injured, and I am tired of the fight against Jack Frost. Sorry to give up the lemons, as they grow much finer fruit out there than in the richer hammocks."

Not having enough Satsumas to do as proposed, I wrote to Messrs. —— ——, nurserymen, asking if they could furnish me a few Satsumas next winter, and their reply is: "All our budded trees in nursery were killed to the ground last March, Satsumas among the rest." So you see Satsumas are not so very hardy after all!

This report settles the question of *hardiness*, and knocks all the romantic inspiration out of the Japanese Success, so far at least as competition in the orange market from Delaware or any of its intervening states, and even north Florida, is concerned. If any others among your readers got the least enthused over the article in question, this bit of investigation may prove a sedative, and admonish us once more to take all such wonderful announcements *cum grano salis*. The advice of the late Hon. David Crockett, to "be sure you are right before going ahead," is well worth heeding.—E. WILLIAMS.

Satsuma Again.—Almost an ignoramus in regard to oranges, and without any intention of disputing Dr. Phelps' conclusions respecting this Japanese variety on page 431, July GARDEN, I yet wish to inquire if he refers to the Satsuma as budded on *Citris trifoliata* stock, or as grown on its own roots. And others may succeed so well that they do want more than a half-dozen Satsumas in their groves; R. D. Hoyt, of Bay View, had a very profitable crop last season, and it was a photograph of one of his Satsumas on trifoliata stock which was used for making the illustration on page 269, which tree had 625 fruits on it—rather more than half a box! Dr. Phelps may be on the wrong tack.—J. H. McF., *Penna.*

The Navel Orange.—What is known as the Navel orange is said by dealers to be the queen of oranges. The best growth comes from Southern California, where the raising of this particular orange has recently become a craze. Last season, in San Bernardino valley, 550,000 trees were planted, and it is expected that before this season is over there will be 1,000,000 in all set out. The genuine fruit commands a high price, and dealers in California produce here in New York say that not many of the real Navel oranges reach this market. The eastern limit of the supply just now is Chicago, but with the growth of the added trees in the San Bernardino district, there will come plenty of the fruit for New York. Men who are in the orange business, and do not care much for oranges as a rule, say they can not resist the Navel. It has a delicious taste, superior to the "Florida," is more juicy, and seems, in these latitudes, more like ripened fruit when eaten near where it is grown.—*New York Sun.*

Strawberries vs. Grain in California.—A farmer in Tulare county, who had grown poorer for several years on grain raising, on 160 acres, resorted to two acres of strawberries to help him out. Those two acres enabled him to pay his most urgent debts, and also to plant a good orchard. The two together emancipated him from grain slavery and debt. He derives an income of $800 an acre from those strawberries.—*Merced Express, California.*

English Walnut in California.—Don Bernardo Guirado, one of the most sagacious of our country merchants, owns a walnut orchard a few miles above his store at old Los Nietos, which he told us yields him a net profit of $15,000 every year. As the orchard contains 100 acres, this is at the rate, year in and year out, of $150 from each acre. J. H. Burke has a 40-acre orchard near Rivera, which, although not in full bearing, last year gave him a return of within $40 of $6,000. These figures show that the English walnut is a good tree to plant. —*Los Angeles Herald.*

About Bananas (See AMERICAN GARDEN for June, page 332).—In some parts of Cuba the fig or date banana is grown, so called locally on account of its small size. It is there regarded as the finest of varieties, as it possesses a rich aromatic flavor not contained in the dead sweet sorts known to commerce. It is seldom exported because of its dwarfed appearance, and few people aside from West Indians comprehend its superiority. A popular tea dish is prepared by simmering it in cheap but pure tart wine. Some use claret. A small lump of butter is placed in the liquid when hottest, and the fruit nearly cooked. Other bananas can also be used in this way. A Cuban lady mentions the method for cooking bananas by roasting. This should be done in hot wood ashes. They are considered a delicacy for persons whose digestion repels the raw fruit. Ordinarily they can be served with rich, sharp cheese.

Native Plums.—The Wild Goose is yet perhaps the most profitable of our native plums. Marianna is in no respect superior, and in my opinion, not as valuable; but it may be a valuable stock for better varieties, as it can be grown readily from cuttings. Deep Creek comes soon after the above, is not as large, but far superior in quality; in fact, it is about the best. De Soto is nearly as large as Wild Goose, and much better in quality. It is an excellent variety. Louisa is one of the best, taking all things into account; large as Wild Goose, three weeks later, dark red and of extra fine quality. Golden Beauty is the latest of all plums, except the Damsons. It is about two-thirds the size of Wild Goose, immensely productive, round in form, and is beautiful, sweet and pleasant, but not high flavored. It should be picked from the tree before fully ripe. These are all I have fruited, except except one, the Bassett, a sweet little free-stone of no practical value.

As to profit I can not say much, as we have never sold many. When peaches fail they may be profitable, if people will eat and use the Wild Goose, which is perhaps the most profitable of all our natives. They rot under the trees by the bushel with us, as the price they bring will not warrant us boxing and shipping. The Lombard is my choice for profit.

I have the Caddo Chief, Shipper's Pride, Early Red from Texas, and Robinson, growing, but not yet fruited. I secured a crop of plums on all my bearing trees the past season by smoking the trees frequently with coal-tar and mouldy hay; the latter seems as good for the purpose as the first, and is easily used.

I am trying all the new natives as fast as they can be obtained. I graft on large native plum trees, and soon have them fruiting.—SAMUEL MILLER, *Missouri.*

Marketing Fruits.—The following points in the marketing of fruits, by E. Hallister, before the Southern Illinois (Alton) Horticultural Society, are worth careful attention: "If you have produced fruit of the best quality and have picked, assorted and packed with skill, you may reasonably expect to get reward commensurate. It will be well for the shipper to occasionally follow his fruit, note its condition on arrival, see what and how others are sending. Such an object lesson will prove well worth the time and expense. Another point he will make by such a trip, is to see the market and style of customers at the different places. Some will take one grade or class of fruit, another a different, perhaps better grade; such personal knowledge will be of great benefit and is essential to success in this business. By knowing the character of your market, you can discriminate as to quality, not daring to send to one what would readily move in the other. We always have two grades to ship, and one we reject, which may, in part at least, find use in the family.

"In order to know how the packing of fruit has been done, I adopted the plan of marking each package with a number or initial, keeping a record and notifying consignee. The fruit grower has at times some fancy berries, peaches, etc.; these have found highest prices in the large cities, such as Chicago or Kansas City. My best prices on such was one dollar per basket for peaches in the latter place, and early in the season as good prices there on asparagus as at Chicago. For your shipments select good commission men in a few markets; keep in constant communication with them; use the wire freely; send them the best and in the best shape, and they will want your fruit."

Fruit Shipping.—The scheme adopted by the Chicago & West Michigan railway for running its fruit train provides that shippers are to load into the cars, and the station agent is to act as receiving agent, checking off the fruit and giving receipts to those who desire them. Fruit is to be delivered at the expense of the shipper. This is very nearly the "granger" system of the Illinois Central, and there can be no question that it, or some modified form of the same, will prove highly satisfactory and successful.—*Allegan* (*Mich.*) *Gazette.*

Grapes and Wild Cucumbers.—A very common complaint last season was the premature decay or falling off of the leaves of the Niagara and other white grapes. Whether this was due to continuous wet weather or to the work of insects, I am not prepared to say; but as a preventive or means of saving the crop, I have accidently, I think, discovered what may be the means of saving the crop another year. It is well known that when the grape vine loses all its leaves the fruit does not come to perfection, but becomes insipid.

A sicyos or wild cucumber vine found its way up among the leaves of a Niagara grape vine growing in my yard, and, whether by its shade or the attraction of insects from the vine, the grape remained in a vigorous growing state all summer.

I noticed the unusually healthy state of the grape vine very early in the season, and watched it for results. The consequence was that there was no rot or decay on either leaves or fruit. I thought it worthy of note, especially since all the leaves of white grapes in the neighborhood were completely fallen off. If one of these wild cucumber vines or its seed were planted on every fifteen or sixteen feet of grape trellis and should be the means of saving the crop, it could not possibly do any harm, and I think it well worthy of a trial.—T. B., *Mercer Co., N. J.*

The increase of the exportation of apples from Nova Scotia to England is something remarkable. According to Mr. Johnson, statistician of the Dominion of Canada, this export, which in 1868 was but $44,000, reached, in 1888, $700,000. At the same time the increase in the quantity of apples annually sent to the United States was from $35,000 to $400,000.—T. H. HOSKINS, M. D., *Vermont.*

Tasmanian Apples.—The Tasmanians have some very fine apples, of which the best approved in this market are the Scarlet Pearmain, the Scarlet Nonpareil and the Sturmer Pippin; some of the former have fetched 18s. per box, which, we presume will leave a very handsome return for the shipper. Before we go any farther, we may say that the Tasmanian apple box leaves nothing to be desired, and the present system of packing, *i. e.*, wrapping each apple in tissue paper, and not lining the box with paper, cannot be improved upon; but there are several points in which the putting up has been faulty. In the first place, the fruit has been generally rather over-ripe. This is a very important point, and if future shipments are put up less ripe, they will arrive in a much better condition. Another point is that the apples have not been properly sorted before packing; large apples and small apples have been packed together. Great care should be taken in the future to have evenness of size in each box, whether the apples are large or small. The next very important point is the management on board ship. In the first place, the nearer shippers can get to a direct transit from Tasmania to London the better, and in the interest of the trade we hope that it will become of sufficient magnitude to trade to induce steamers to call at a Tasmanian port for the London shipments during the season; but a more important point is that during the passage the temperature of the cool chamber should be maintained at 45° to 50°, and never below 45°; in a recent catalogue we read the word "frozen" much too often.—*Australian Trading World, London.*

Apples in Manitoba.—Several varieties of crabs are found to succeed at Hendingly, and out of quite a number of Wealthy apples planted some fifteen years ago, two yet survive. Other persons have tried apples, but having, as I contend, planted unsuitable varieties, they have failed to keep then alive beyond the third year. Some of the Russian varieties give promise of hardiness. —THOMAS FRANKLAND, *Manitoba.*

The Iona grape has been very far from satisfying the hopes of commercial growers. In this respect we must class it with the Adirondac. But both varieties will repay the careful attention of the skillful amateur grower; and it must be admitted that for dessert quality the Iona is equal to any grape in the world. It is a good grape, even when not fully ripen, being one of the kinds which are quite eatable before they are mature. It is also a long keeper.—T. H. HOSKINS, M. D., *Vermont.*

The extension of grape growing in Canada is quite remarkable. Not only in Ontario, but down the St. Lawrence river on both banks as far as Montreal, and below, grape growing as a business is extending itself, and fruit is being produced which is preferred to that brought from the southward. It is a fact that on the upper St. Lawrence and about the north end of Lake Champlain, better grapes are produced, and the fruit is a surer crop than in western Massachusetts.—T. H. HOSKINS, M. D., *Vermont.*

Hoffman and Cloud Strawberries.—Our report on the Cloud and Hoffman, set one year ago, is not a very favorable one. The Hoffman had a light crop. The Cloud did better, but not as well as some of the old varieties. It is possible that they may do better in the south than in the north.—*Fruit Growers' Journal.*

Strawberries for Southern Illinois.—C. H. Smith, of Southern Illinois, says that the sooner the Crescent berry is discarded, and all raise a large, firm berry and raise less of them, there will be more money in the crop. As the acreage planted this year is larger than last year, he looks for a repetition of low prices, even with half a crop. He thinks the plants set out as a fertilizer ought to be set in a row with other plants, instead of in a row by themselves. He reports such varieties as the Warfield, Windsor Chief, Sharpless and Bubach as bringing the most money in Chicago.

Mulching of Strawberries.—Mulching is necessary to successful and profitable strawberry growing, and I think that its advantages are not as yet fully understood. Though contrary to general practice, I would say mulch as soon as plant growth ceases in the fall. If this arrives before the ground freezes, all the better. As a matter of course, it will not do very well to mulch where the ground is water-soaked, but I would even prefer to mulch at that time rather than wait till the ground is hard frozen. This year I mulched when the ground was comparatively soft, and I did very little injury to the plants, not near so much as I have done heretofore when the ground was hard frozen; but as I expect that this idea will provoke discussion, I shall not say any more on the subject at present.

After all that I have said on this matter, I think that the profits of strawberry growing, where obtained, are largely due to the individual. Any person engaged in this calling ought to have more than an average share of patience, perseverance and prudence, patience to bear losses and failure without repinings, perseverance to persist in spite of misfortune, and prudence to prevent him from attempting to do too much.—*Wm. Jackson, before Southern Illinois Horticultural Society.*

A New Peach Disease.—A new peach tree enemy has appeared upon the Michigan lake shore in the shape of a fungus which attacks the young shoots, causing the trees to drop their leaves and the shoots to become discolored. Professor Taft thinks that the fungus is similar to the raspberry blight or anthracnose. His recommendations, in the *Allegan* (Mich.) *Gazette*, are as follows: "In case the trees are killed to the ground, dig them out at once and burn them. If the branches only are dead, I would cut them back to short stubs, say from two to four feet from the tree trunk. I would then apply from a peck to a half bushel of unleached wood ashes (or twice the quantity of leached ashes). These should be applied broadcast over a space from eight to fifteen feet in diameter, according to the size of the tree. It will be well also to wash the trunk and stubs with a solution of green vitriol, say one pound to ten gallons of water. The orchard should be cultivated every two weeks until the middle of August. The disease generally occurs on trees that have been neglected and have not been cultivated.

"It is sometimes induced by late cultivation, which causes a second growth or prevents the proper ripening of the wood. No injury may be apparent the next spring, but, if a dry summer follows, the anthracnose may appear, and will so weaken the trees that they will not be able to withstand even a mild winter. By examining apparently healthy trees, you will find the last year's growth covered with light yellow spots. Whenever they are present the branch should be cut off and burned.

"This is in no way caused by insects, and it is nothing like yellows, although it may prove even more destructive than that disease after a dry period and under a slack system of cultivation."

Mulching Vines.—In a dry season especially, I have several times found it an advantage to mulch tomato, squash, cucumber and melon vines, and one of the best if not the best material to use for this purpose is partially rotted bagasse from a sorghum mill. Stir the soil thoroughly, killing out all the weeds, and then apply. We are subject to drouth here and the ridge land dries out very rapidly, and unless some protection is given the crops will prove a failure. The bagasse will not dry out so easily as the majority of other materials usually used for mulching, and if properly applied will be of considerable benefit.—A.

French Mushrooms Made to Order!—A "mushroom manufacturer" is the latest thing in novelties, even in these days when commercial license is often carried to the utmost possible length. An individual living in the department of the Aveyron, struck by the high price at which mushrooms were being sold in his district, conceived the idea of fabricating the delicacy out of turnips. He cut the turnips into rounds, dried them, and after giving them a dab of the paint-brush, disposed of them to unsuspecting customers as the genuine article.

For some time he drove a thriving trade, but unluckly for him he one day sold a batch to a gourmet who was not so easily taken in. Indignant at the trick played on him, the gourmet brought an action, which has just resulted in the condemnation of the mushroom manufacturer to two months' imprisonment. It was in vain that he pleaded that he had enabled his fellow-citizens to regale themselves on a vegetable which they regarded as a good specimen of the mushroom at a cost far below that commanded by the real article. Vain, too, were his efforts to demonstrate that his mushrooms could be consumed without entailing disastrous consequences on lovers of the delicacy. The court turned a deaf ear to his specious arguments, and has allowed him two months' leisure to meditate on the error of substituting dried turnips for honest mushrooms.—*London Telegraph.*

Dried Tomatoes.—Housekeepers who have many tomatoes can easily preserve a large quantity of this very easily-cultivated fruit by drying it. This method requires little outlay, and comparatively little trouble. Scald and peel the tomatoes, as for canning. Boil them slowly in a porcelain kettle or stone jar until the original quantity is reduced one-half. Then season them in the proportion of a teaspoonful of salt, and half-a-cupful of sugar to a gallon of stewed tomatoes. Spread on plates and dry quickly without scorching. As the moisture dries away, and the stewed fruit loses shape, scrape it up so that both sides may dry, and let the contents of several plates, heaped up lightly, stand in bright sunshine a little while before putting away. Store in bags and keep dry. When wanted for use soak them in a quantity of water for several hours, or over night. Stew in same water long and slowly—three or four hours—keeping boiling water at hand to add if it grows thick, and so is in danger of burning. It should be quite thin when done, and may be thickened with bread crumbs and seasoned.

A New Spinage Disease.—A new fungus has been discovered upon spinage in New Jersey, by Dr. Halsted and by him named *Entyloma Ellisii*, in compliment to J. B. Ellis, the noted mycologist. "The infected leaves had lost all their normal green color and were of a pale yellowish white shade—in fact, presented much the same appearance as succulent foliage may take on after having been frost bitten some time before. Upon a closer examination, however, the surface of the whitened leaves was found coated in spots with a fine light substance that under the hand lens was seen to be in minute tufts." To botanists this new plant is unusually interesting because the entylomas have not qeen known to attack spinage-like plants. The disease is not known to be serious.

Machine for Hilling Celery.—A Michigan man has patented a machine for doing this laborious work. On a frame like that used on a riding cultivator, two mold-boards turning towards each other are hung, quite a distance apart at their forward ends and nearer together at the rear. The rider can control these mold-boards, raising or spreading them at will. The mold-boards are run on either side of the row, throwing the earth towards the plants.—*Rural New-Yorker.*

The Tomato in Maryland.—The tomato occupies a conspicuous place in the agriculture of a large part of Maryland. Besides the constantly increasing use of this vegetable, or fruit, in its fresh state, the demand for it for canning has become very large. "The tomato pack" of the whole country, was estimated at 3,343,000 cases in 1888, and 2,977,000 cases in 1889. To this aggregate Maryland contributes over twenty-three per cent. or nearly one-fourth. The quantity annually canned being from thirty to thirty-five thousand tons, there must be at least forty thousand tons of tomatoes ripened yearly in this state, representing the product of twelve thousand acres of land. Some estimates place the area and total product much higher.—H. E. Alvord, *Maryland Experiment Station.*

Glands on Catalpa Leaves.—T. V. Munson, of Denison, Texas, has discovered nectar glands on the leaves of *Catalpa speciosa*. These glands occur on the under surface in the axils of the large veins. These glands attract bees. This is an interesting discovery, and undoubtedly an important one to apiarists. This fact has been before recorded, however, by several observers. Mr. Munson writes as follows:

"On June 5, I discovered numerous honey-bees collecting honey from the under-side of the leaves of *Catalpa speciosa*. On closer observation I found in the forks of all the ribs with the mid-rib on lower face of leaf a smooth glandular (without stalks) surface (the other parts of the surface being densely pubescent), exuding nectar till a little drop would fill the cavity in each fork, whence the bees extracted it."

Lessening the Work.—A good sharp steel rake and a prong hoe will materially lessen the task of keeping the garden clean. They can be used earlier than either the cultivator or the hoe, will more thoroughly destroy the weeds, and leave the soil in a better tilth. They lessen the amount of hand weeding that is to be done, as they will work closer to the plants. Some soils bake very easily, especially after a shower, and one of these will be found a good tool to break up this crust and give the plants a chance to grow. The prong hoe will work deeper than the rake, so that in order to receive the very best results both are needed, one for the smaller plants and the other for the large ones.

Plant Patents.—This is an amusing world. What would men do without the Agricultural Department to find fault with? and yet they are always calling out for it to assist in some of their pet schemes. They denounce the tariff and then want it enlarged to protect American seedsmen, although we all along thought these same seedsmen were the largest importers of seeds in the country, and only raised a few seeds that are better grown here than abroad. Some things are rather hard to regulate by law, and seed raising is one of them; but when it comes to naming varieties it is harder to regulate by law than the naming of children. If I raise a seedling turnip, I can call it anything I please, but if any one is disposed to obtain seed of my turnip and raise turnips of their own, they can re-name them from the nine muses or anything else they choose, although I couldn't myself tell the difference in the roots, if there was any. People would buy according to the name they like best and wouldn't trouble themselves about me or the other fellow. If I brought over a German fuchsia or rose with a name that would startle a Russian I would have to change it before it would be an "American beauty" or the flower would not be appreciated. The law might give me the right to my bush and its sale, but everyone might have their own bushes and own names, patents, copyrights or whatever the law chose to give them. Whoever knew a seedsman to have a new bean, bush or climbing, but every other one had a bean as soon as it was known, just like it, excepting in name? The only difference between peas is, that each man's is the earliest. We fear that it would do little good to give them all a patent for the earliest lettuce, and if the honors were divided, those with large gardens would raise their own seeds before they would go to a hundred different dealers to be supplied. We would like "Uncle Jerry" to help us, and would help him in doing any real good, but politicians always did mix seeds badly, and it does little good to tell us that the agricultural interests are depressed when with our present imperfections we can raise more than we can sell. The law cannot change the color of the grass, and is there not an old song that has something in it about "when the trees in summer time their verdure dare not show?" Even the pesky Canadian thistle defies the law. —J. D. W.

Electric Light Experiments at Cornell.—The experiments conducted at Cornell University Experiment Station, upon the forcing of plants by means of the electric light, of which we recently published an account, have given admirable and definite results. The experiment was a large and interesting one throughout. The tests were made with many plants and cuttings, the leading plants being radishes, carrots, peas, lettuce, spinach, endive, and cresses. These plants were grown from sowing until maturity, a duplicate house having the same species grown for comparison. The experiment will be conducted another winter before results are announced.—*Agricultural Science.*

Water as an Insecticide.—I find that I am daily placing more reliance upon water as an insecticide. Not long since it was my misfortune to procure a lot of plants which were badly infested with the mealy bug Various reputed remedies were tried in vain, and it seemed as if all the plants in my house would have to be destroyed; but two weeks of vigorous work with the hose has destroyed nearly every mealy bug in the house.

The water is dashed against the plants with some force and the insects are knocked off. This forceful watering at the same time removes all dust from the leaves, and keeps the plants clean and vigorous. The aphis and most other insects can be treated in the same way with success. We have lately become the possessors of an innumerable horde of minute spotted mites, apparently an introduction from Europe, and which is just now getting a foothold in some parts of this country. It is by far the most formidable of all the greenhouse pests with which I am acquainted. We have tried many insecticides, and none have had any effect upon this pest, but we have been able to keep it in check in a cucumber and melon house by the vigorous use of water.

At times we are obliged to syringe twice a day for the mites, and, this in certain cases is some disadvantage to the plants, but we found that we could not hold our own against the pests. The aleurodes or white fly, also a recent importation from Europe, can be held in check in the same way. A light syringing of the plants will cause the flies to start up in great numbers, when the water is turned on to them as they fly and they are brought to the floor. For the last two months I have discarded all fumigation in a little conservatory attached to my residence—much to the delight of the family—and have fought insects with water, and my plants never looked so well as now.—L. H. BAILEY.

There are Geniuses whom nature or more acute powers of observation and application raise above their fellow men, but all of us are not geniuses. A few great singers find engagements whenever they want them at enormous salaries. Good singers meet with difficulties because we have so many who can sing; but poor actors and singers are never wanted. If we bring good fruit and vegetables to market there will be a rate for them unless there is an over stock, which never happens for any length of time with the best productions. We or other people do not care for the habits or morals of those who make the cloth or raise the vegetables we buy. But with a private gardener it is a different thing. Consumer and producer are brought into contact and more is mutually expected.

It may be said on both sides that to be respected they must be respectable. If an employer takes a mean advantage of his gardener it is human nature to retaliate when opportunity offers. If an employee is taught dishonesty and untruthfulness by example he may be expected to practice them. If people will instruct their gardeners to sell plants and flowers and give them the money, while saying that they never raise anything excepting for their own use or amusement, they may expect to be deceived in their turn. If a gardener sells the flowers or fruit belonging to his employer and keeps the proceeds he is worthy of no consideration, and the mercies of the law are too good for him; but if he has been taught such ways by those who intrusted him, they are morally to blame. Some of the graduates from "our largest commercial establishments" seem to have devoted more time to learning the tricks of the trade, than all else, and are a constant menace to a respectable establishment. A good gardener and a good man becomes a friend to all about him, above or below, and is honored and respected by the community in which he lives.—J. D. W.

A Trick of the Trade.—One house receives a whole car-load and sells it out at as good rates as possible to other houses, acting in that case as a jobber. Before the whole car-load is sold he has ordered by telegraph another car-load from Chicago, where the market is very low at the time. He orders them on commission. He is informed by telegraph as soon as his car is starten, and perhaps before it has started from the point at which it was loaded in the country. He has time, if he deems it necessary, to sell a fair portion of the car-load and order his car from Chicago before the one coming to him from the country, and have it arrive the day after. Now he has got the bulge on the market, and as his Chicago goods cost him less than he has sold at, he can undersell those that he sold to and still get his ten per cent. from the grower. Neither is that all. When he makes his returns to his country grower, he can make them the basis of the sales made on a market he has himself broken down, and get his ten per cent. Besides that he makes as clear profit the difference at which he sold his car and the market price, after he has broken it.—*Fruit Growers' Journal.*

Companion Plants.—While it is true that there is a struggle for life going on between various species of plants, and that in the struggle only the fittest survive, it has seemed to me equally true that certain plants love company. I am quite sure there are some that do better for growing together. As a rule, a pine hates solitude, and, whether it is one of its own kind, or one of some other species, so long as it is not alone, your pine tree rejoices when it has the sympathy of a companion. Many a planter of a "pinetum" has reported that this one or that one has not proved hardy (hardy being often a term including the results of all kinds of bad treatment), when one of the chief grounds of failure, was a too great degree of ground loneliness.

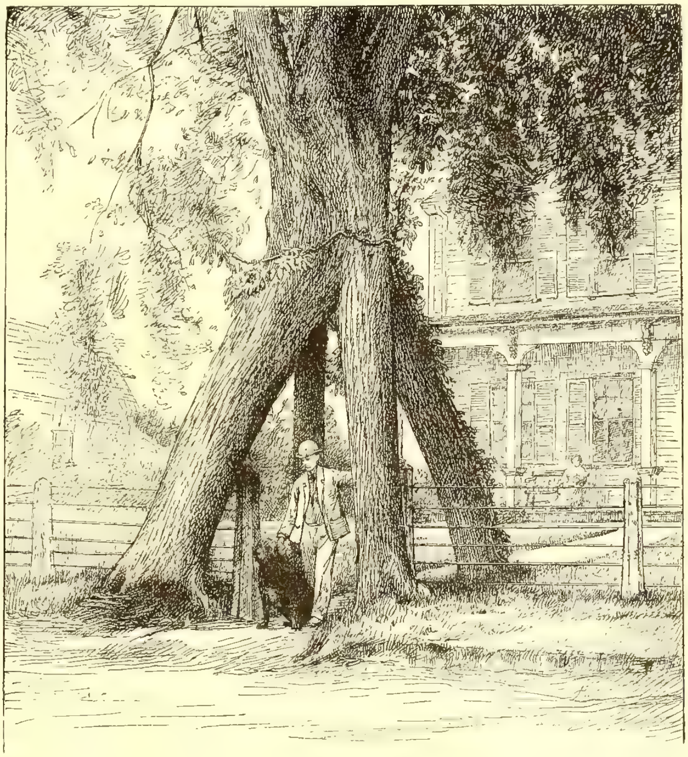
Certainly there are some species that have to grow together to such a degree that only their best efforts are displayed in fellowship, and of this I saw a few days ago a striking instance. It was in regard to the common periwinkle, *Vinca minor*, anent which, if you are a nurseryman, you must disguise your disgust when customers ask you for "myrtle." It is one of the grandest of dwarf evergreens when put under the drought of large trees. These, with their millions of water carriers in the earth, make it so dry, that often even grass will not grow, and the only green thing we can have is this periwinkle. It does not seem to care whether it has water or not. I never saw a spot too dry to conquer it. Now we have another shade-loving plant, the moneywort (*Lysimachia nummularia*), that loves shade, but does not love drouth. Put that under your dry-ground trees, and it languishes away. But don't it love to get in among the myrtle! Try it and see. The plot I saw was a magnificent sight! There was a round bed under a lot of old white pines. It would have been a blank desolate patch without it, and the beautiful flowers of the moneywort gave a charm to the periwinkle undescribable. The tops of the periwinkle shoots came up through the mass of flowers, and looked for all the world as if a million of gold dollars were scattered over the bed. No doubt the owner would prefer this to the gold dollars! I don't know, but truly, a bed of this kind was beyond all price.

Now why should this money-wort, which would not do well at all there alone in the dry, do so well when the ground must be actually dryer by having the moisture-sucking roots of the periwinkle as well as those of the pines to contend with? I don't know; perhaps though the ground itself was dryer, there was good moist air enclosed by the mass of periwinkle branches; perhaps a good many other things. The fact remains that this companionship seemed to suit both, and the plot of periwinkle and moneywort, to my eyes, made one of the most agreeable and successful combinations I ever beheld.—THOMAS MEEHAN, *Philadelphia.*

An American Knapsack Pump.—B. T. Galloway, chief of the section of plant pathology of the Department of Agriculture, announces that he has completed arrangements by which a cheap and serviceable knapsack pump for the application of fungicides is to be put upon the market by an American manufacturer.

The Ozark Region.—The southeastern slope of the Ozark mountains, some four hundred miles in length, is the finest fruit region I ever saw, and even the flat "Pea Ridge" is very good. The Ozark mountains have a trend from northeast to southwest, with many side spurs running down into the valleys. The soil is Oolitic limestone rich in plant food, very fine for fruit of all kinds. The mountains act as complete windbreaks, so that the earliest blossoms are not injured. The apple, pear, peach and plum are as much at home as if they were indigenous to the soil. They bear large crops and of the finest specimens, Bellflowers, Rambo, Maiden's Blush, Northern Spy and many old and new varieties. Bartlett, Angouleme, Tyson, Seckel and other varieties, American and foreign, are brought to their very best condition. Such a fruit region near eastern cities would be a gold mine, of more value than the finest land on the Miami or Wabash.

The people appear to be alive to their good lands and appreciate their advantages. They need capital and try to invite it. Any investment in that region must be a good one, for aside from its fruit advantages it is a most delightful climate. Many new fruits have originated there, because the fruit interest is paramount to any others. The Loy apple has no superior in vigor, quality, hardiness and long keeping qualities. So of the Levi; a beauty indeed, and a long keeper. The Gano is dark red, large and of most exquisite taste and a long keeper. Before me now lies, June 30, a specimen of each, received to-day from a friend. I wish you could taste with me their delicious flavor and crispness at this late season! Talk of Italy, Florida and Los Angeles! Here lies a region that will surpass all of them! Water as pure as spring water can be—and plenty of it; a society wide awake and progressive, intelligent and hospitable! Game of all kinds is to be found in the Ozarks, from bears to quails, and fish in abundance. To an invalid no more inviting region could be found. I have no interest in this region; I only write as I know and observe. —A. C. BATES, *Indiana.*



INARCHED ELMS.

Inarched Elms.—In our last issue (page 432) we described and figured an old apple tree in which the main branches had been tied together by a living brace made of united twigs. This species of grafting or inarching can be used in many places to advantage. The accompanying illustration shows four elms inarched about twelve feet above the ground. The trees were fastened together securely when young, and they have now united into one solid trunk for a considerable space.

Sow-Bugs do not Eat Snails.—In the April number (p. 251) of the GARDEN, L. Stevens mentions sow-bugs as a remedy for snails. His bugs must be better educated than mine. I have watched them for years and know that they eat plants. They are fond of rex begonia leaves and stems, gloxinia and gesneria bulbs, and will eat geraniums and a few other plants just above the ground where they congregate in large numbers. Even the innocent earth worm I have caught in mischief. He destroys hyacinth bulbs and will sometimes work his way under the bark in roots, but he is the most innocent of all intruders with me.—MRS. J. V. TAYLOR, *Salem, Oregon.*

Sans Fences.—The owner of a country place in Orange county, N. Y., says by the removal of fences and sinking stone walls, the size of the place is apparently doubled, and the enjoyment of it increased to a greater extent.

Disagreeable Gardeners.—These days of hot and suddenly changing temperature are trying to the tempers of gardeners and employers. Some have stood the test so far, but many have not. Trials have come to all, the bugs, "the inevitable foes" have appeared with droughts in parts of the western country, and long continued rains on some parts of the Atlantic seaboard have washed away the plants. All this is bad and discouraging, but not enough to dishearten the busy man, fond of a garden, but without the time to give it superintendence, who has to trust to his hired gardeners. Happy is he if they prove satisfactory! This is the most discouraging part of many a man's endeavors. He does not grudge the expenditure of his money, and is willing to submit to fate in the contest with weeds, climate, diseases and insect foes, knowing that his case is no worse than others; but the human element is more than he can contend against. This course alone brings more country places into the real estate agent's hands than any other. Could it be removed, their value about all our cities would soon be doubled. Those who have had to contend with indifferent, disobliging and careless gardeners alone know the trial they are. They can destroy more cherished plans and plants than all other causes combined, and do it in a way to escape detection. They are the men who bring their craft into disrepute, and in the end injure themselves, their employers and all other gardeners. Some men are so addicted to one form of gardening, as for instance ribbon-gardening, that they will give no attention to other things. If their employer wants a little natural beauty and grace in some way, they will pretend to acquiesce, but see to it that their pretended efforts always result in failure and are left alone to pursue the work they like to do, unless their employer gets tired of the whole, and gets rid of them and their hobby together.

This explains why gardeners who are painstaking and obliging retain their places and do better than those who are superior in skill but are disagreeable on a gentleman's place. The gardener is so important to the domestic concerns of a family that his personality is of more consequence than almost anyone on the place.

Gardeners have their trials no less than their employers, who are often unreasonable and inconsiderate, but more commonly are accustomed to hiring men and know a good one when they get him. Most of us know places where none of the help remain for any great length of time, and it seems as if there must be something radically wrong in the management; but these places are exceptional. A gardener without a good temper and an obliging disposition had better go into some other vocation rather than make himself a temporary obstruction on any country place, for he will not be long wanted.—J. D. W.

Grafting Wax.—I call it grafting wax, though its use in grafting is a small part of its proper use. It is to cover wounds of plants, that they may heal. For in curing vegetable wounds, as in curing the wounds of animals, we can only exclude the oxygen and bacteria, that nature may do her work. Hence the small fruit grower or florist will frequently find it advantageous to use this wax. For that matter, it is a good salve for your own cuts; and especially for the deep cracks that come in some fingers working in damp earth. First wash the hands clean, very clean, to get the dirt out of the cracks. The wax will exclude air and dirt, and give the cracks a chance to heal. So when applying it to our cuts or bruises on plants, shrubs or trees, make the surfaces clean and cut off any ragged wood or bark.

The ingredients are: Rosin, four parts (by weight); beeswax, two parts; beef tallow, one part. Mutton tallow may be used, but is not so good, I have known some to use lard, but I cannot recommend it. Some think linseed oil better than tallow, and it may be if perfectly pure.

Heat the ingredients in a kettle over a slow fire for thirty minutes, stirring them that they may be thoroughly mixed. Then pour the mixture into cold water, and "pull" it as you would molasses candy, until it is quite light colored. Make into rolls half an inch in diameter and six inches long, and keep in a cool, dry place. If you use it in cold weather, soften it by putting it in lukewarm water; if in warm weather, it will work better if first put in cold water. After you have it, you will be surprised how often you will have good use for it. Perhaps the best name for it is salve for plants. I have always used it and my father used it before me, so I know that it is good.—S. M. J.

Climate and Plants.—I am surprised to see in Mr. Willits' article the statement on p. 318, June AMERICAN GARDEN, as to the want of knowledge in 1856 of our western interior, its climate and capacities, and particularly his remarks as to wheat growing in the northwest. I had the honor to be called on by Judge Mason, then the Commissioner of Patents, to prepare an extended paper on climatology for the agricultural report of 1853, which occupies pages 327 to 433 of that volume. In that report, p. 338, etc., treating of wheat climates, I claim all the northwestern plains as favorable, and quote Sir John Richardson at length (p. 391) that wheat at Lake Winnipeg is equal to any grown in the United States. In several portions of my report full claim is made to the capacity of the interior and northwestern areas of the United States and British America. Again in 1854-5 I prepared a quarto volume at the War Department giving the first isothermal and rain charts for the continent.

Still more fully in my climatology of the United States, 1857, I asserted the productive capacity of the interior climate, and in the concluding chapter, p. 529 to 534, I assert that on an area of 500,000 square miles of plains and their woodland borders, all the grains of the cool temperate latitudes can be produced abundantly. I sustain Lord Falkirk's claim that the northwestern area will support 30 millions of people. The fullest claim now made does not exceed my claims made first in 1853, and in 1854-5, and again in 1857. And in these works, each a large volume, I published the most complete records of climatological observation yet published in this or any other country.—LORIN BLODGET, *Philadelphia.*

Native Plants in Cultivation.—The North American wild flowers, as a rule, are looking well under cultivation in our grounds this season. The trilliums, especially *T. grandiflorum*, *T. sessile*, *T. nivale*, *T. erectum* and *T. erectum* var. *album* have bloomed very freely. *T. stylosum* is somewhat new to us, but as far as we have been able to study its nature, we think it bids fair to take a front rank in this family of our North American flora. The leaves of the flower are beautifully tinged with rose. It is probably perfectly hardy here in New England. *T. sessile*, var. *Californicum* is a rank grower, with large green leaves. It looks somewhat like our eastern species, *T. grandiflorum*. Violas have bloomed very nicely this season, especially *V. Canadensis*, *V. pedata* and *V. pedata* var. *bicolor*. The latter has shown large and fine bloom. *Shortia galacifolia* has bloomed here a number of years in our sandy loam soil, and is, without doubt, perfectly hardy here. *Silene Virginica*, one of the most showy of our North America perennials, is in full bloom. The flowers are rather large, scarlet in color, and a long time in bloom. The California brodiæas and calochortuses are coming into bloom.—GILLETT & HORSFORD, *Mass.*, *June.*

Pansies and Mignonette.—For autumn flowers, sow pansy seed in any partially shaded spot—it will be better if in some low damp soil—and transplant about the first of September. Pansies make a far more pleasing second crop than rag-weed or purslane, which you will surely have unless you give the ground some useful work to do. Pansies, by common consent, are called spring flowers, when, in fact, they can be had in the greatest profusion and luxuriance in autumn; and what is more beautiful in the garden than pansies in Indian summer? They are as bright and cheerful then as in June. The handsomest pansies I ever gathered were from self-sown seed, having hid itself in a lily bed, where it grew uncared for, unnoticed and unmolested, until all the other flowers had succumbed to frost. Give the pansies a fair chance and there are no plants that will repay so liberally for all the attention they have received. There is no flower in the garden that speaks to us so plainly as does the pansy. Its broad, full, cheerful face is all expression.

The mignonette is a fitting companion for the pansy. It is modest, sweet and retiring. For saucer bouquets, pansies and mignonette blend most happily together. Make rich any vacant place you may have, work the soil deep, then sow the seed any time in July or early August, and after your fair-weather friends have been frost-bitten, the Frenchman's "Little Darling" will show you a friendship that the frost only sweetens. There are many varieties of mignonette listed in the seedsmen's catalogues, as there are of all popular flowers. For the open border we prefer Golden Queen, but you cannot go astray in planting any of the popular kinds. One important consideration must not be overlooked, viz.: If you wish mignonette in perfection, the soil in which it is grown must be worked deep, must be very rich, moderately heavy and moist.—C. L. A.

Destroying Weeds in the Lawn.—I have tried several methods of clearing our lawn of dandelion and dock, and find that nothing is so effectual in totally destroying them as a small quantity of turpentine poured upon the plants. I had dug these weeds out quite clean, but they came up again stronger than before. I then experimented by applying carbolic acid, kerosene and turpentine. Kerosene had but little effect upon them, while the acid and the turpentine destroyed them outright. As turpentine is much the cheaper of the two, it was given the preference, and I am now using it upon all weeds that are hard to kill as soon as they are discovered, and am well pleased with the result. A teaspoonful of turpentine is sufficient to destroy almost any weed.—JOHN F. RUPP, *Shiremanstown, Pa.*

How to Make the Artillery Plant Shoot.—The artillery plant, or pilea, is cultivated partly for the reason that it possesses the peculiarity of forcibly shooting its pollen into the air like the discharge of a miniature cannon, and yet I find few people who have ever seen this bombardment actually take place. I have been producing this discharge of late by syringing plants when the sun is shining on them brightly. The plants are well budded, and this slight showering causes the flowers to burst open, and the anthers shoot their pollen in every direction in the most interesting manner. Our common wild nettle (*Urtica gracilis*), with which the artillery plant is closely allied, often behaves in the same manner.—L. H. BAILEY.

Pensacola in August.—One of the most delightful and unique places in Florida, or the south, is the city of Pensacola. Even Tallahassee and St. Augustine cannot excel it in the beauty of its gardens and streets. The fences are covered with semi-tropical shrubbery, while gardenias and camellias grow profusely around the houses. Figs and pomegranates are at home here, the bright red fruit of the latter contrasting finely with its dark green foliage; and there seems to be no limit to the growth of the Scuppernong grape. The fruit of this vine is ripe at this time of the year, and is sold at the railroad station by the little "piccaninies" at five cents a quart. The althæas, *Hibiscus grandiflorus* and *H. coccineus* are blooming profusely, and a few flowers of the gardenias may still be seen. Roses are as common as the dandelion in the north—teas, hybrid perpetuals, polyanthas and climbing roses—the favorites, of course, being Chromatella and Maréchal Niel. Of the trees, the most conspicuous are the magnolia and live oak, while the rare little holly, *Ilex myrtifolia*, is not wanting. The barberry, *Berberis vulgaris*, and *Olea clavata*, an exotic evergreen, may also be seen. The air is everywhere laden with the fragrance of the tuberose, jasmine (*Jasminum revolutum*), and many other fragrant flowers. Every porch is covered with some kind of vine or creeper, *Antigonon leptopus*, honeysuckle and clematis being most numerous. In fact, the characteristic feature of Pensacola during the summer is the abundant growth of her vegetation. The trees almost hide the harbor from view. The small, old-fashioned houses are almost buried in rank growths of vines and creepers, and the lawns of Bermuda grass are everywhere dotted with the flowers of cultivated plants and shrubs. "The Land of Flowers" is a term particularly appropriate to Pensacola and the vicinity.—P. W. Reasoner.

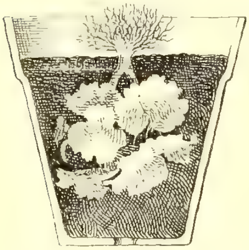


Fig. 1. First attempt—at 10 years of age.

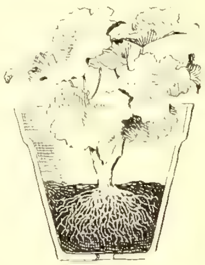


Fig. 2. Finds the right end—at 12 years.

Evolution in the Potting of Plants.—The graphic illustrations of this process on pages 500 and 501 will be readily comprehended and recognized.

Plant Humor.—There are awe-inspiring plants like the night-blooming cereus and the Easter lily, and there are also cheerful, mirth-provoking plants. Look at the hanging-basket of pink and white oxalis. They are the very frolicsome little children among house-plants, and to see them tuck their little leaves and flowers together and go to sleep after the sun sets reminds one of a tired-out baby. The jolly sun-flower, with its round, beaming face, makes one laugh to look at it, and as for the yellow squashes and pumpkins, they fairly seem to blink their eyes in the sunshine, as much as to say "Just make pies of me," "Laugh and grow fat." I have heard them likened to golden breast-pins on the bosom of mother Nature. There are comical shapes in beets, gourds and other vegetables. One can make quaint hanging-baskets out of beets, carrots, parsnips by scooping out a place at the top and keeping water in it, and very soon it will be covered over with green sprouts. There is a curious little plant called hens and chickens, shaped something like a full-blown rose, only green. It keeps sending forth little sprouts, just like the old one. I have a round green box with a large "hen" in the center. As the "chickens" peep out between the leaves, I pull them off and stick them down in the box, where they start readily.

If you keep your eyes and ears open, you constantly see or hear about funny shapes or queer habits in plant life. There is the Chinese pitcher plant, with a regular lid, and this pitcher holds about a cupful of water. It is quite common in the island of Ceylon, where monkeys appreciate this curious joke among plants, and laugh and chatter as they raise the lid and drink off the water. But North Carolina can boast of the Venus' fly-trap, one of the most innocent-looking plants with its leaf spread wide open. The gay and festive fly lights on it, the leaf claps together, and the poor fly is soon absorbed. Venus looks as if she enjoyed herself getting the best of the poor fly. If you want to be puzzled, and also to have exercise, try to find two blades of ribbon grass striped exactly alike; or make a blow bag of the live-forever. The balloon vine is another queer thing. The dry pods with seeds make a nice rattle box. There is plenty of human nature in the dodder, or love-vine, which clings to any plant which happens to be near it, and, having no roots in the ground, steals its living out of its victim, and to show how it enjoys and laughs over its cuteness, the vine is as yellow as gold.—Sister Gracious.

City Flowers.—It would be interesting to know just what is the educating effect upon that part of the city's youth which we may call the pavement population, of the sight of flowers the year through. During the winter months, though not always accessible, they are always visible, and during the summer months they fairly overflow the city—in the florists' windows, in great clusters on the street corners, and, best of all, in living profusion in the parks. It is not wholly a fancy, perhaps, that all this has more than a slightly refining influence upon these young souls, into whose lives comes so little that makes for the amenities of life. It is a good thing for a child to learn to love a flower. In learning that he has learned much more. His imagina-

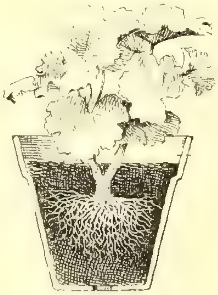


Fig. 3. Wet feet—15 years.

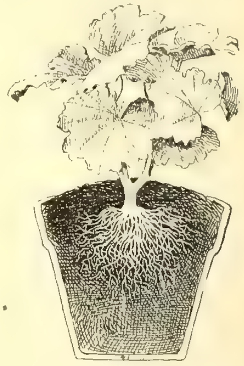


Fig. 4. Dry feet—16 years.

tion has been drawn upon, his delicacy of sentiment has been quickened, and the tender feelings for one kind of natural beauty goes hand in hand with a feeling for other kinds. Because a boy loves a rose, the more likely he is to love a bird, and when he loves a bird he has begun the lesson of tender affection for all things great and small which helps in the making of every grace of character. And so one should be glad of the roses on the street corners—glad both with the eye and the heart—and of the tulips in the parks in their season, and for the water lilies when they come, and for the glowing geraniums, and for every unkempt little fellow who stands gazing with intent eyes at their beauty. He is taking in lessons, perhaps, that neither teacher nor preacher could give him.—*N. Y. Sun.*

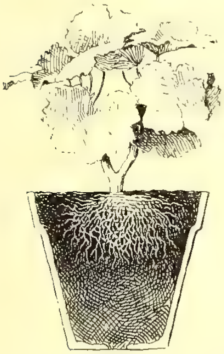


Fig. 5. Honest measure—17 years.

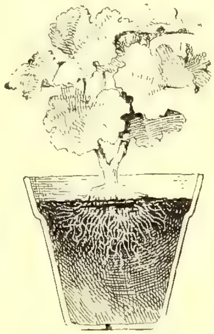


Fig. 6. Penurious—18 years

Fresh Flowers.

We cannot make a hedge so tight
About the flowers we plant and prize,
But some wild bird with canny eyes
Shall see, and wing a happier flight.

As soon as one red bud shall ope,
The eager fingers of the breeze
Will bear new perfume through the trees,
Or down the hill, or up the slope.

Then some who pass with hurrying tread,
Shall think of childhood's happy round
Within some far-off garden ground,
And, musing, see no clouds o'erhead.

And those who gaze into our face
Shall know, though reading not its name,
That we have found than gold, than fame,
Something more full of joy and grace,

And straightway seek with strengthened powers
The hopes which, baffled, early fled,
The living where the sod looks dead,
To find and keep new cheer, fresh flowers.

—Charles N. Sinnett.

The Colors of Flower Gardens.—It does not require any knowledge of color, considered as a subject of inquiry to appreciate the beauty of flowers, and yet we are willing to credit the fact that our gardeners are ready to welcome more information than is current on this interesting topic. Professor Church's little book on color, recently published, is not only the latest, but a sound, brief and practical treatise, and it does not cost much, although fairly well supplied with chromatic illustrations. In reference to the coloring of flowers and foliage, Professor Church writes :

"If we take a small piece of violet gelatine (used for crackers, bonbons, etc.), mount it on a black card and look at a flower-garden through it, a series of effects of the following sort will be observed : Mature green foliage seen in shadow assumes a slaty-gray color ; young leaves appear of a decided gray-pink; the yellow patches on the foliage of the golden euonymus and aucuba are light red ; the yellow tulip and the blossoms of the common gorse become a brilliant and more intense crimson-scarlet ; dark brown wall flowers have a crimson hue ; a bed of white and yellow tulips contain nothing but pale lilac and bright scarlet flowers ; blue, violet and purple flowers are altered in hue to a much slighter extent. *Without doubt, the extraordinary increase of diversity of tones and hues in the foliage of trees, which is brought about by the interposition of this violet film, corresponds to real differences which commonly escape observation. Particularly is this the case with the regular reflections of sky and cloud hues from the glossy surfaces of leaves and the peculiar colors of their immature foliage.*" [Italics ours.] We should be glad to quote other passages of similar interest to gardeners, but content ourselves with this morsel from the interesting and valuable little volume.

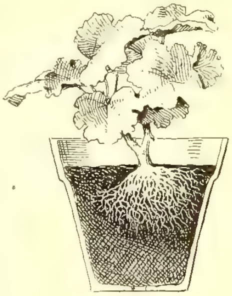


Fig. 7. In a hurry—19 years.

Making the Most of the Garden.—We do not refer to the ground, but to the garden—*qua* garden. Let us, for once, sum the various ways in which it is made useful by diverse persons.

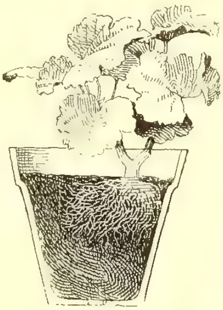


Fig. 8. Careless—20 years.

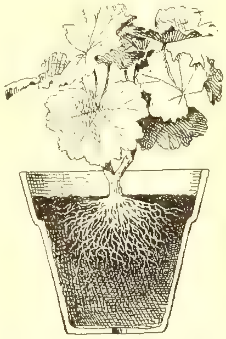


Fig. 9. In business for himself—21 years.

There are, first of all, those who like the gay colors of blooms, and enjoy the carpet garden or the little knot of annuals before a cottage, but have little specific liking for flowers. Next comes the gardener who has a fondness for varieties. He appreciates color and form, but has a genuine love for species and new beauties. The collector is a little more extreme. He discovers a life-long, increasing interest in a single order and class of plants. If he has some scientific taste, then, like Mr.

Darwin, he finds hours and days of rare enjoyment in observing and experimenting, hybridizing and raising seedlings, and arranging all sorts of traps for nature. The artist has only a little of any but the first kind of those various interests, but, with pencil and brush, sits, day after day, drawing and coloring a single bunch of flowers. Not far from where we write hangs a beautiful group of wild roses, the work of many long hours, and one can see at a glance what minute and newly discovered beauties this skillful, patient lover of flowers found in those green leaves, thorn-clad stems and delicately shaded petals. But even the artist does not exhaust the delight that is in flowers, for the poetic mind finds in them new and tender thoughts. Like Burns' daisy, they speak a thousand things most difficult to say, and become a new half-human language. But all these classes of persons still leave unused that capacity of many human and noble hearts to love the individual flower and plant, not as a variety or a species, but as its own, tended by its care and loved because loving is natural and sweet to such hearts. Surely now, with all these persons in the garden, we have made the most of it—at least with their help. But no, the great Teacher stands before us and tells us how He has considered the lilies. Just so far as we fail to have any one of all these numerous interests in flowers and growing things, do we fail to make the most of the garden. We cannot have them all in great measure—but the artist's, for example: would not a little more training with the pencil in our youth have given us a greater appreciation of growing, graceful forms of leaves, vines and branches? Could not our scientific curiosity and interest have been greater? Could we not, even now, become collectors in a small way? If we had done what Mr. Darwin, at the last, regretted sadly he had failed to do, namely, read a little in the best poets daily, would not our poetic interest be stronger and now afford us more of the honey of Hymettus? Nay, if we loved the individual plant and its blossoms as does many a humble cottager, would not we find one of the sunniest, happiest spots of earth in our little garden.

Along Fences and Walls.—The thrifty farmer should cultivate his fields close up to the walls and fences. By so doing, he has the benefit of crops on a long narrow strip of land that is often given up to weeds and brush, which produce an abundant crop of seeds, and are a convenient hiding place for vermin.

Farmers are sometimes heard to say that it does not pay to cultivate this narrow line; that the labor is greater than the return. It may be so on their land. If they have followed out this principle for years, you doubtless will find the walls down in places, the shrubs of former years now trees, and the strip that was once a few feet in width, now measuring a few yards. It doubtless would take the crops of several years to pay for the labor of clearing such a thicket, but all this great labor could be avoided if a little attention was given it every year—much less than is required to keep the thicket within bounds.

Do not understand that I advocate the destruction of all trees and shrubs on the farm lands. I do not by any means. They have their place, but it is not along every line of fence and wall.—WARREN H. MANNING.

A Song of Roses.

Roses red and roses white,
In the garden, glowing bright,
Growing in the soft, clear light
Of the sunshine golden—
Surely, never flowers more fair,
With their dainty fragrance rare,
Ever blossomed anywhere—
E'en in Eden olden!

As we watch them hour by hour,
We can fancy every flower
Is the velvet, perfumed bower
Of an elf or fairy;
But, tho' look whene'er we may
At dewy eve or dawn of day,
Ever are the elves away
From their dwelling airy.

Roses red and roses white.
Opening in the sunshine bright,
Ever beautiful to sight—
Of Love a graceful token!
While velvet leaf and foliage green,
Most perfect workmanship e'er seen,
To all who see, God's love may mean,
Tho' not in language spoken.

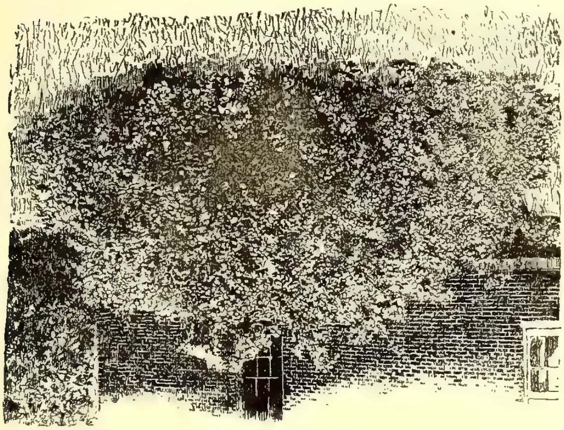
—F. A. REYNOLDS.

"Fascinating Sand" in Parks.—Heaps of sea sand are placed, at public cost, in the parks and squares of Berlin, where the German children sport under the general supervision of the police. So excellent an example was followed recently in Boston, where the Massachusetts Emergency and Hygienic Association provided seven such play-grounds. Writing of the pleasant outcome of the small investment for this and other out-door recreation in the interest of the city poor, a correspondent of *The Worcester Spy* says:

"The ladies started the movement, the school committee gave the use of the school-yards, the public contributed the money, and reliable, motherly women were employed four days in the week to matronize the little folk. It was a pretty sight to see these children, doomed to spend the summer in town, playing with shovels and pails in the sand, whose fascination was unending. Others were playing horse with worsted reins, or tossing bean bags, skipping rope, and playing ball. If a different set had come every day, it is calculated that the matrons would have entertained almost 130,000 children. Now and then a basket of flowers would be contributed, so that each child went home with a nosegay. This season it is hoped the contributions will be sufficiently generous to establish twenty sand gardens and extend the benefits."

Virginia Creeper on the Lawn.—How many people know that the Virginia creeper is handsomer as a lawn plant than the Kilmarnock willow and similar trees? Trained over a rock or a trellis four or five feet high, it makes a most free and graceful mound of foliage.

Spiræa trilobata.—One of the most serviceable of the spireas is the subject of our illustration, *S. trilobata*, often known as *S. triloba*. It is perfectly hardy in our northern states. It makes a large, compact, round-headed bush four or five feet high. It is one of our freest bloomers. The flowers are white, borne in dense clusters.—L. H. B.



SPIRÆA TRILOBATA.

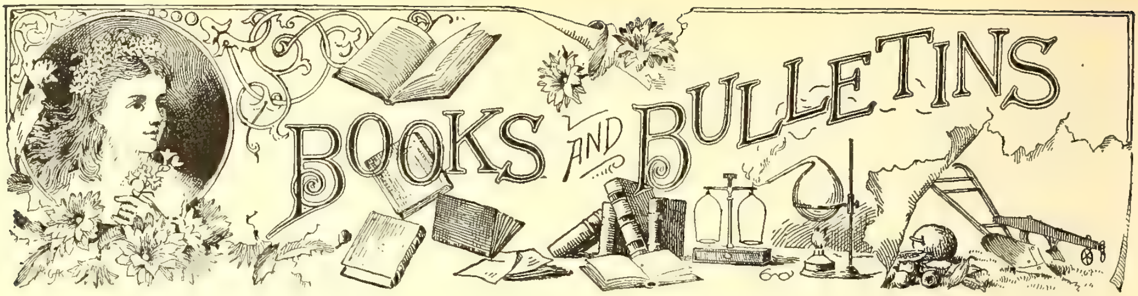
The Scarlet Geranium.—The scarlet geranium, as it is called, or *Pelargonium zonale*, has become a general favorite with all classes of people. Its various shades of color, from brilliant scarlet to pure white, are most attractive and highly valued. It is one of the leading ornaments of the garden in both city and country, and no lady thinks her window-garden complete without it. It is a perpetual bloomer, and unsurpassed in attractiveness when planted in beds or masses on a lawn. It is a tropical plant, and therefore will not stand much frost. It is easily propagated from cuttings and will grow tolerably well in any common garden soil.

After a bed of geraniums has been nipped by the frost and become unsightly, they may be dug up, the earth shaken from the roots, and after having been deprived of all their leaves may be packed in dry earth or sand in the cellar, where they will keep very well till time of planting out in spring. Sometimes they keep well hung up in a cellar where frost does not enter. but this cannot be depended on. Well rotted stable or barnyard manure makes them grow strong, tall and luxuriant, but is not conducive to fine large trusses of flowers. Whoever wants fine blooms and short stocky plants must have resource to fertilizers, and the best of these I have found to be pure bone-meal. No matter, almost, how poor the soil at the time of planting, if a handful of bone-meal be well mixed through the earth around each plant, it will cause it to flower profusely, and the flowers will be very much larger than those stimulated by stable or barnyard manure. If ladies would be particular to use more bone-meal when potting their geraniums in the fall or planting out in spring they would be well rewarded by a profusion of very large blooms, which is the chief end and object of all their care in nursing, both summer and winter, this very desirable plant called scarlet geranium.—Bone-meal is also valuable for many other flowering plants.—T. B., *Trenton, N. J.*

Hollyhocks.

Pull the horses up and stop,
At this roadside let us rest;
On that green bank what a crop
Rising to its very crest!
Colors white, and pink, and yellow,
Growing up above the rocks;
Colors bright and colors mellow
Blended in those hollyhocks!

Lifting Chrysanthemum Plants.—The plants should be lifted carefully, disturbing the roots and ball of soil as little as possible; the pot sufficiently large to take the ball, and large according to the size of the plant; give a soaking watering, and at once place the plant under shade, not crowded; have a free circulation of air about and over every plant, yet protected from the winds; syringe the leaves several times a day for four days, then the shade may be removed, and thereafter water in the pot as is needed. Mr. P. had 500 plants which had grown too large for his pots. September 23 he was lifting and potting in pots two sizes too small, and then placing them close together in the sun, where they remained for several hours without being watered. After all were potted, they were watered and covered with boards close above the plants. Mr. P. knows better; but then, 'tis his way. The result would be, the lower leaves die and drop, and the flowers imperfect and small. Mr. L. lifted a large plant September 18th, with buds the size of a large pea. The ground was dry and loose. He first removed the top soil, forming a basin around the plant, and gave a soaking watering for two days; then inserted a concaved spade all around, cutting off all the extending roots to the size of the pot, carefully lifting and placing the ball in a 14-inch tub, first placing some dry soil in the bottom, and filled with dry soil and a rich top dressing; then gave a soaking watering, placed it under an open shed, syringed the leaves twice daily for five days, and then moved it into a "snug harbor" in the full sun, thereafter watering as often as needed. At no time was there noticed any wilting of the leaves, and the buds continued to grow. It received no apparent check. The flowers will be good. Mr. A. lifted six ordinary sized plants September 5th, showing buds the size of a small pea. The ground was dry when he inserted a clasp digger, cutting upon two sides to a six-inch ball, lifting the ball and dropping it into an eight-inch pot, filling with dry soil, then a soaking watering and placed at once in a shaded greenhouse; was not syringed, but was watered in the pot daily. I saw the plants again two weeks afterwards, when the leaves had lost their bright green color. Many were dead and dropping, and the buds had not enlarged. Evidently, the plants had received a severe check, from which they probably will not fully recover, nor will there be good blooms.—JOHN LANE, *Chicago.*



BOOKS AND BULLETINS

Annals of Horticulture.

Annals of Horticulture in North America for the Year 1889. *A Witness of Passing Events, and a Record of Progress. By L. H. Bailey. Pp. 249; cuts, 52. Rural Publishing Co., New York.* Among the new books of a horticultural nature there is none which contains, inside of 250 pages, more good, practical sense and valuable information than the Annals of Horticulture for 1889. It comes as a fruit of the past year, containing nearly all that is new in the way of horticultural information. It is crisp, fresh, juicy, and full of the aroma of common sense. There seems to be no rotten specks in it, and I think it not only serves a good purpose now, but it will do to keep, and will show just what the year 1889 brought us in the way of good things. May succeeding volumes be as good!—H. E. Van Deman.

A New Vegetable Book.

How to Make the Garden Pay. *By T. Greiner. Pp. 272. Illustrated. Philadelphia: William Henry Maule.* This is a good book. The author has cut loose from the old methods of treating the vegetable garden, and has presented a volume which is novel in design. He appears to have copied fewer of the old blunders and less of the stereotyped expressions than any of the recent writers. He has made more than a mere alphabetical catalogue of garden vegetables with notes of a few leading varieties and leading points of culture. Over one-half of the book is devoted to matters of detail, which every gardener should know before he undertakes the culture of any vegetable. He devotes chapters to requirements for success in market gardening, to hints on marketing, irrigation, garden implements, cold frames, hot-beds, forcing-houses, drainage, insects, fungous diseases and the like. His three chapters upon manures and fertilizers for the vegetable garden are the best which have been written in this country in a garden hand-book. The author has drawn well upon the practical science of the day, and wherever he has quoted, has done so to good advantage. The book is never overdrawn or inflated; it does not hold out glaring inducements; and so far as we have seen, is never misleading. The chapter on fungi is entirely inadequate to the subject, even for a concise hand-book of this size, and there are some other points where perhaps a little more fullness would have been better. But the author's brevity in certain places may come from his desire to be eminently self-constrained, for he graciously informs us that the book is not written by a professor of horticulture, and is therefore "plain, practical common-sense, without useless flourishes and poetic ornamentation."

The second part of the book, which treats of the culture of the various vegetables, is written much after the catalogue plan of older volumes, although it appears to have improved upon them somewhat. The author has no varieties to sell, and we therefore look upon his opinions without prejudice. Upon the mechanical execution, especially in the matter of cuts, we can not bestow so much praise. Most of the cuts are trade cuts, a large part of them being mere conventionalisms, and of no practical use to the book. Some of them are entirely inaccurate. The pictures of cabbage and tomato plants, on page 126, for instance, would never be recognized unless they were plainly labelled. On the whole, however, we can recommend the book for its intrinsic merits.

Novel Grass Book.

How to Know Grasses by Their Leaves. *By A. N. M'Alpine, with preface by Robert Wallace. 16mo. Pp. 92. 18 plates. Edinburgh: David Douglass.* Of all plants, it would seem that grasses are the most difficult to identify by leaves alone; and yet there are no plants in which such indentification is so important. The herbage of pastures rarely comes into flower, or in case it is not pastured too closely, the inferior species which cattle will not eat often mature, and the better species are obscured. It is a fact that there is no adequate knowledge of the composition of permanent pastures, and the avowed object of this neat little hand-book is to afford a key to their study. To be sure, this is not a horticultural subject, but the method of presentation is so novel and so well wrought that a review of it is in place wherever good work is appreciated. The method of the little book is very simple. In fact, its simplicity is its vital feature, for to be intricate would mean to be useless. It is intended for the intelligent farmer as well as the professional botanist. The author divides his essay into two parts, the first of which considers the common pasture grasses, and the second, grasses in general. He divides all grasses into twelve groups, which are characterized by leaves and leaf-sheaths. Group 1 considers colored grasses; group 2, the variegated species; 3, the bulbous and flat-ribbed grasses; 4, cord-rooted; 5, acute-sheathed; 6, net-sheathed; 7, bitter-tasted; 8, bristle-bladed; 9, hard-bladed; 10, hairy; 11, eared; and 12, ribless-bladed grasses. Into one or another of these groups the diligent observer can place all British grasses of any economic importance. The book is so novel in its character, and this subject is so important, that it should be in the hands of every student of plants.

The Art of Preparing Vegetables for the Table. *By Sutton & Sons, Reading, England. 16mo. Pp. 68.*

How to Cook Vegetables.

This is the neatest hand-book of its kind which has yet come to our table. The mechanical execution of the little book is elegant. The book is an enlargement of a chapter which appeared a few years since in one of the author's books upon general horticulture. A few concise and well considered remarks of a general nature open the volume, which is thereafter devoted to a series of recipes upon all the common vegetables. It is the best thing of the kind which we know.

A Model Improvement Association.

First Annual Report of the Springfield (Mass.) Improvement Association. The Springfield Improvement Association exists for the purpose of cultivating "a public sentiment in favor of improving and beautifying homes, streets and surroundings of Springfield, and to endeavor to promote in every legitimate way the best development of the whole city." The first year's work has been an encouraging one. Among other things, a public bath-house has been erected through its efforts, improvements of the river enbankment have been inaugurated, and 6,450 tulip bulbs have been distributed among the residents of the city. The particular work outlined for next year, and which has received attention during the past year as well, is the following: "To have our paved streets swept daily; to have the cobble stones between the tracks of the street railroad replaced with block pavements, in harmony with the paved streets; to curb and straighten Merrick Park; to further urge the city to sprinkle the streets; and to make an effort for the appointment of a road commission." Incidently the association aids in other undertakings which look toward the elevation of the beauty of the city, in literature and works of art. It is just the kind of an organization which should be emulated by other cities and villages in the country. The report contains an essay on "Hints for Home Improvement," one upon "The Streets of a City," and another upon the "Reform of Street Sprinkling."

A New Flower Book.

Southern Floriculture. *A Guide to the Successful Cultivation of Flowering and Ornamental Plants in the Climate of the Southern States. By James Morton. 16mo. Pp. 312. Illustrated. Clarksville, Tenn: W. P. Titus.* A book on floriculture in the south is a welcome addition to our list of horticultural books. This one is a collection of cultural directions for various important plants, both tender and hardy. The species have no arrangement and no consecutive manner of treatment. To us the book appears to lack method. The novice will look for some chapters of a general nature upon the management of soil, upon potting, training, watering, propagation, laying out of grounds and borders, manner of forcing, kinds of houses, etc., but none of these subjects are discussed, if we except five pages upon "Greenhouse Requisites and Appliances," which is entirely inadequate even for the south. Another fault with the book, to our mind, is the abundance of history and poetry, which sometimes interfere with perspicuity of treatment, and which are never useful in a mere hand-book or "guide to the successful cultivation" of plants.

The book, of course, has many merits. The English is much better than is usual in books of this class. The directions are clear and sensible, and it will undoubtedly prove a useful book. The chapter upon chrysanthemums is particularly good.

Child's Botany.

The Fairyland of Flowers. *A Popular Illustrated Botany for the Home and School. By Mara L. Pratt. 4to. Pp. 154. Illustrated. Boston: Educational Publishing Company.* "Teach your boys, also, the little legends and poetry of the flowers—make the flowers real, living things to them—teach them that the grandest men, many of the most noted writers, have always loved the flowers, and have thought it worth while to be very tender in their dealings with them. Break up in your boys any existing notion that flowers are 'good enough for girls'; or that it is manly to trample down the little purple violets, or to snap off the heads of the bright-faced daisies. The average healthy, wide-awake boy may rebel at 'set' moralizing, but he is not insensible to the beauty and grandeur of nature if only we are wise enough to present it to him in a way that he can accept and understand." This avowal of the purpose of the book is healthful, sympathetic and practical. We need to get more sentiment into the minds of children rather than more out of them. The old style of didactic or "set" moralizing is unnatural and repulsive, and much of the present distrust of sentiment is due to it. When flowers become "real living things" to the young, an indelible taste for nature is assured. This "fairy land of flowers" seems to us to present a good guide to the early observation and love of nature. It requires the actual experience of the teacher with it to test its strength, but it certainly undertakes the subject in the right spirit. A few simple lessons introduce the book upon how plants grow and flower, and an easy key and flora follow. Short poems and some stories are interspersed. Such a book—much like our Chatterbox books—must be very attractive to a child.

The illustrations are not always good. Many of them are simply ornaments to the page, as they show no characteristics of the plants, while some are positively misleading. A picture of an hepatica represents branching and many flowered scapes! One of the labiate nettles is inserted to represent the true nettle, and the picture of cockle represents anything but that plant.

Seedless Fruits.

On Seedless Fruits. *Memoirs of the Torrey Botanical Club, Vol. I, No. 4. By E. Lewis Sturtevant. Pp. 44. 75 cents.* This is the second time that Dr. Sturtevant has prepared an essay upon this subject, and it therefore presents the results of a prolonged investigation. The author is the possessor of a library very rich in economic botany, and he is a wide reader; and he has gleaned diligently for the facts in this paper. The paper is an alphabetical catalogue of fruits which are wholly or partially seedless, the term fruit being used in the horticultural sense. 61 entries are made. Among the fruits of common culture in this country, the apple, barberry, cherry, cucumber, currant, grape, kaki, melon, mulberry, orange, pear, pineapple, plum, raspberry, strawberry and tomato are discussed. The seedless plum is undoubtedly the monstrous fruit produced by the fungus *Taphrina pruni.* A most interesting chapter could have been written upon seedless cucumbers, a subject that has never yet been fully analyzed.

The author has not purposed to give any elaborate discussion of the known or assumed causes of seedlessness, but he has indicated some of the most common and probable ones. He thinks that tenderness of flesh is usually associated with slight seed-producing power, and it seems to be a "legitimate field for horticultural effort, to experiment with seed from nearly seedless forms, or with seed which is more fragile or seemingly imperfect, in the endeavor to produce increased quality, as also with seed from unripe fruit." The paper is a suggestive and valuable one throughout, and should be in the hands of all who study plants.

WINES AND VINES OF CALIFORNIA. *A Treatise on the Ethics of Wine Drinking. By Frona Eunice Wait. Pp. 215. Illustrated. San Francisco: The Bancroft Company. 50 cents.* "The state of California exports to the Atlantic coast as much wine as is imported into the whole country from France, and consumes herself of native production three-fourths as much as is imported into the entire United States from all countries. * * * There is ample proof of the purity and high quality of our native wines, but our home dealers not only sell them on their own merits, but substitute them for all kinds of foreign wine. * * * So-called California wine found in the eastern market is as a general thing manufactured in a three-story brick vineyard in some back street, not far from where it is offered for sale, and in the majority of cases contains everything but grape juice, while the genuine article takes the hint and puts on a French label." This is reason enough to write of the "ethics of wine drinking," or, rather, wine making. But Mrs. Wait grasps the subject broadly. She is evidently a connoisseur in wines. She compares European and American conditions and methods, and she discusses Californian wine-making practices in detail. It is a timely book to wine users, for it points out differences between the good and the spurious, and it educates the consumer. The burden of the book lies on the ethical side. The authoress believes in wine drinking, and she says so boldly, giving commanding reasons for her belief. She even introduces a chapter upon "Wine as a Temperance Agent." (We wonder who will write upon gunpowder as a fire extinguisher!) She maintains, with reason, that intemperance comes primarily from habit rather than from appetite. She lays intemperance upon the unattractiveness of the hearthstone. It is a social evil. She lays it upon the American cuisine, of which there is none "so wretchedly bad as that distinctively American." The American laborer's "board is cheerless, and he seeks relaxation where it can be found." She believes that wine at home is better than wine at a saloon, the same as we now endeavor to amuse our boys at home rather than let them seek entertainment where they must.

A Book on Wines.

The book treats of "The Art of Wine-making," "How our Native Wines are Managed," "Early History of the Industry," "How to Drink Wine," "Enterprising and Prominent Wine Men," and the leading wine centers of California. The authoress writes entertainingly and in a convincing manner. She certainly knows her subject.

A GUIDE TO THE CULTIVATION OF THE GRAPE VINE IN TEXAS, AND INSTRUCTIONS FOR WINE MAKING. *By E. H. Andrae. Pp. 45. Illustrated. Dallas: Texas Farm and Ranch Pub. Co.* This is a useful little guide to the novice in Texas grape growing, although it is not broad enough to answer the purpose of a manual. It considers varieties and the ordinary matters of propagation and culture, with a chapter on irrigation—probably the most useful part of the book. The chapter on diseases is entirely behind the times, and that on insects contains nothing of value. The second part of the book treats of wine making.

Texas Grape Book.

BULLETIN NO. 1, VOL. III, TENNESSEE EXPERIMENT STATION. *Experiments in Growing Potatoes. By C. S. Plumb. Pp. 24.* The influence of the amount of the tuber upon yield is again discussed. The *Rural New-Yorker* trench system of potato culture has been made the subject of experiment, and it was found that the total yield would not pay for the cost of labor and fertilizers. It is difficult to account for this result, as others have obtained the most gratifying results from this method of culture. The system is commonly known as the trench system, as it aims to plant the tubers about eight inches deep, so that hilling is not necessary. A record is also made of the behaviors of 74 kinds of potatoes. A novel and useful experiment was a test of the keeping qualities of the sorts.

Potato Experiments in Tennessee.

The Southern Queen sweet potato, upon light clay-loam, was planted April 27, May 4, 11, 18, 25 and June 1, for the purpose of determining influence of date of planting upon yield. "(1) The largest yield was produced from the planting of May 4th. (2) Many more unmerchantable potatoes were produced from the first three than from the last three plantings. (3) The average yield for the first three plats, or early planted, is 489 pounds; of the late planted, or last three plats, 510 pounds, or a difference of 21 pounds in favor of later planting. (4) The average yield of the plantings from April 27th to May 11th was smaller than those planted from May 18th to June 1st, and each plat contained, on an average, 37 pounds more of unmerchantable tubers than did the several late plantings."

Sweet Potatoes.

BULLETIN NO. 31, INDIANA EXPERIMENT STATION. *Small Fruits and Vegetables. By James Troop. Pp. 22. Illustrated.* For the farmer's garden, Professor Troop recommends the following strawberries: Bubach, Cumberland, Wakefield, Logan, Haverland and Henderson.

Strawberries in Indiana.

"Having set strawberry plants both in spring and autumn, and at almost all other seasons during warm weather, I am convinced that those set in the spring, as soon as the ground is settled, do the best, are in the best condition to stand the winter, and produce the most berries the next year. We also find it necessary to protect the plants during winter, to prevent the frost from heaving them out. A light covering of wheat straw or other material, free from weed seeds, is put on early in winter and left until warm weather, when a portion is raked off and left between the rows."

Potato Varieties.

Of 93 varieties of potatoes, the following varieties "seem to be specially worthy of recommendation and further trial: Beauty of Sheba, Breeze, Dictator, Dakota Red, Early Sunrise, Early King, Gold flake, Great Eastern, Garfield, New Queen, Rose's New Giant, Rural New-Yorker No. 2, Summit."

Peas in Indiana.

"For family use, where a succession is desirable, the following list of peas will give good satisfaction: First and Best, or Early Morning Star, Dan O'Rourke, Minimum, Advancer, Stratagem and Dwarf Sugar (edible pods). The last named is prepared for the table the same as string beans, using pods and all."

Tomatoes in Maryland.

REPORT OF THE HORTICULTURIST AND THE CHEMIST OF THE MARYLAND EXPERIMENT STATION. *Report of the Board of Trustees for the year 1889. Pp. 26–94. Wm. H. Bishop and Harry J. Patterson.* The greater part of Mr. Bishop's report is upon tomatoes. Sixty sorts were grown. The causes which determine solidity in the tomato fruit were carefully studied, as were also the characteristics of the varieties. The instability of tomato varieties is noted, and it is thought that "reversion to ancestral types," whatever that may mean, is largely the cause. The conclusions in regard to general observations are as follows: "(1) The larger the fruit the greater the number of cells; this holds true not only with the fruits of different varieties, but with the fruits of a given variety compared with each other. (2) The larger the number of cells the greater the solidity of the fruit, as measured by the proportion of solid flesh to seed and pulp. (3) The larger the fruit the smaller the proportional number of seeds. (4) In general terms, the varieties producing the largest fruits are among the heaviest bearers. (5) The most promising varieties for general culture are Ignotum, Paragon, Favorite, Belle, Fulton Market and New Jersey. (6) The earliest varieties this season were Conqueror, Earliest of All and Alpha. To these may be added Bermuda and Advance."

Experiments with fertilizers upon tomatoes were conducted, from which Mr. Bishop infers that nitrogen and potash are the regulating ingredients in tomato fertilizing. It is noticeable that unfertilized ground gave poorest results, in accordance with results obtained by other experimenters last year.

Composition of the Tomato.

Mr. Patterson made a series of exceedingly suggestive investigations upon the chemical composition of tomatoes at different times and under different treatments. The tomato is a poor food when judged by nutritive qualities. Over 90 per cent. is water, and sugar occupies about 3 per cent. The red tomatoes were found to have less dry substance than the yellow varieties, a conclusion diametrically opposed to the common notion, but their dry matter is richer in food elements than that of the yellow ones. Nitrogen in the albuminoid form is less in the yellow sorts.

Effect of Fertilizers upon Tomatoes.

The effect of fertilizers upon the composition of tomato fruits is indicated to be somewhat as follows: "(1) That potash has the effect of producing a fruit with more dry substance, accompanied by a slight decrease in the sugar and an increase in the acid. This, when considered in connection with increase of yield, is favorable to the use of potash. (2) That nitrates and phosphoric acid have a tendency to produce a fruit with more than the average proportion of water, but with more sugar and less acid than those grown with potash. (3) The sweetest tomatoes were produced on the plots receiving phosphoric acid."

Effect of Weather upon Tomatoes.

The variations of the composition of tomato fruits in reference to weather are stated as follows: "(1) The variation in composition agrees closer with the variation in temperature than with the relative rainfall or sunshine. (2) That the highest water content of the tomato follows closely the periods of highest rainfall; but the range does not seem in any way proportional. (3) That the highest sugar content is either on or following the periods of greatest rainfall. (4) That the rate of yield or ripening depends more on the temperature and amount of rainfall than on the actual duration of sunshine; but the latter seems to exert a decided influence in some periods."

Mr. Bishop exchanged potatoes with the Vermont Experiment Station, and found that the northern seed, at both stations, gave the best results. Potatoes were also cut in different ways.

Observations upon various vegetables are recorded.

Preserving Fruits for Exhibition.

BULLETIN NO. 86, CALIFORNIA EXPERIMENT STATION. *Preservative Fluids for Fresh Fruits. The Sulphuring of Dried Fruits. By E. W. Hilgard.* Professor Hilgard discusses the requisites of the ideal material for preserving fruits for fairs and museums. Such preservatives must prevent fermentation or decay, must be liquid, must not extract color and must not change size of fruits, causing them either to swell or shrivel. In order to retain the size, the liquid must be about equal in density to the fruit juices. The addition of the best grades of commercial glycerine is apparently the best means of increasing the density, and as a guide as to the proper quantity to add, the following percentages of soluble matters to total weight are given:

"Apples and pears about 12 per cent.; plums, prunes, apricots, peaches, about 10 per cent.; cherries about 12 per cent.; most berries, 8 per cent.; currants, 10 per cent.; grapes, in California, 18 to 22 per cent, average, 24 per cent." That is, to any preservative fluid having about the density of water, about 12 per cent. of glycerine should be added for apples, 10 per cent. for apricots, and so on. Several preservative fluids are discussed, but only two appear to meet the requirements: (1) "A solution of one ounce of salicylic acid to five gallons of water, to which as much glycerine has been added as corresponds to the density of the fruit juice, constitutes a preservative fluid which has been used with very satisfactory results heretofore. Trouble has arisen from the use of soda to make the acid dissolve; as already stated, with patience or heating, the water alone will dissolve the acid, and soda need not be used at all." (2) The use of corrosive sublimate (½ oz. to 1 gallon water) is lately recommended in Italy by Professor Pichi, who has used it with marked success in preserving grapes. This is, of course, very poisonous.

Sulphuring of Dried Fruits.

Sulphur is used in the evaporating of fruit in order to bleach the product and to repel or kill insects. Professor Hilgard has made a careful study of the effects of sulphuring fruits, and his denunciations of the operation are well known. The browning of fruits in drying is a perfectly natural process, in whatever manner the evaporation is accomplished, and it is a false taste which demands that the fruits shall be white. "The consumer then has reason to object to dry-sulphured fruit on two counts, either of which is sufficient to condemn the practice. One is that dirty, ill-prepared or damaged fruit may thus be imposed upon him for good quality; the other, that the natural flavor of the fruit is either seriously impaired or sometimes almost completely destroyed, and its acidity is greatly increased. There is another and very serious count in the indictment, namely, that such fruit is unhealthy because containing an antiseptic that impedes digestion, and while the fruit is relatively fresh, causes headaches just as will sulphured wine. After some time, the sulphurous acid originally introduced becomes converted into sulphuric acid, a condiment that few will desire to consume in their daily food."

Analyses are given showing the amounts of sulphuric acid in commercial samples. In one case the amount of this material—commonly known as oil of vitriol—was equivalent to about 25 grains in a pound of fruit (prunes). "In addition to rendering the fruit unpalatably acid, it had been rendered obnoxious both to the digestive organs and to the teeth. No one could habitually consume such fruits without feeling the effects of such an amount of mineral acid, introduced into his food purely for the gratification of the eye with an unnatural tint."

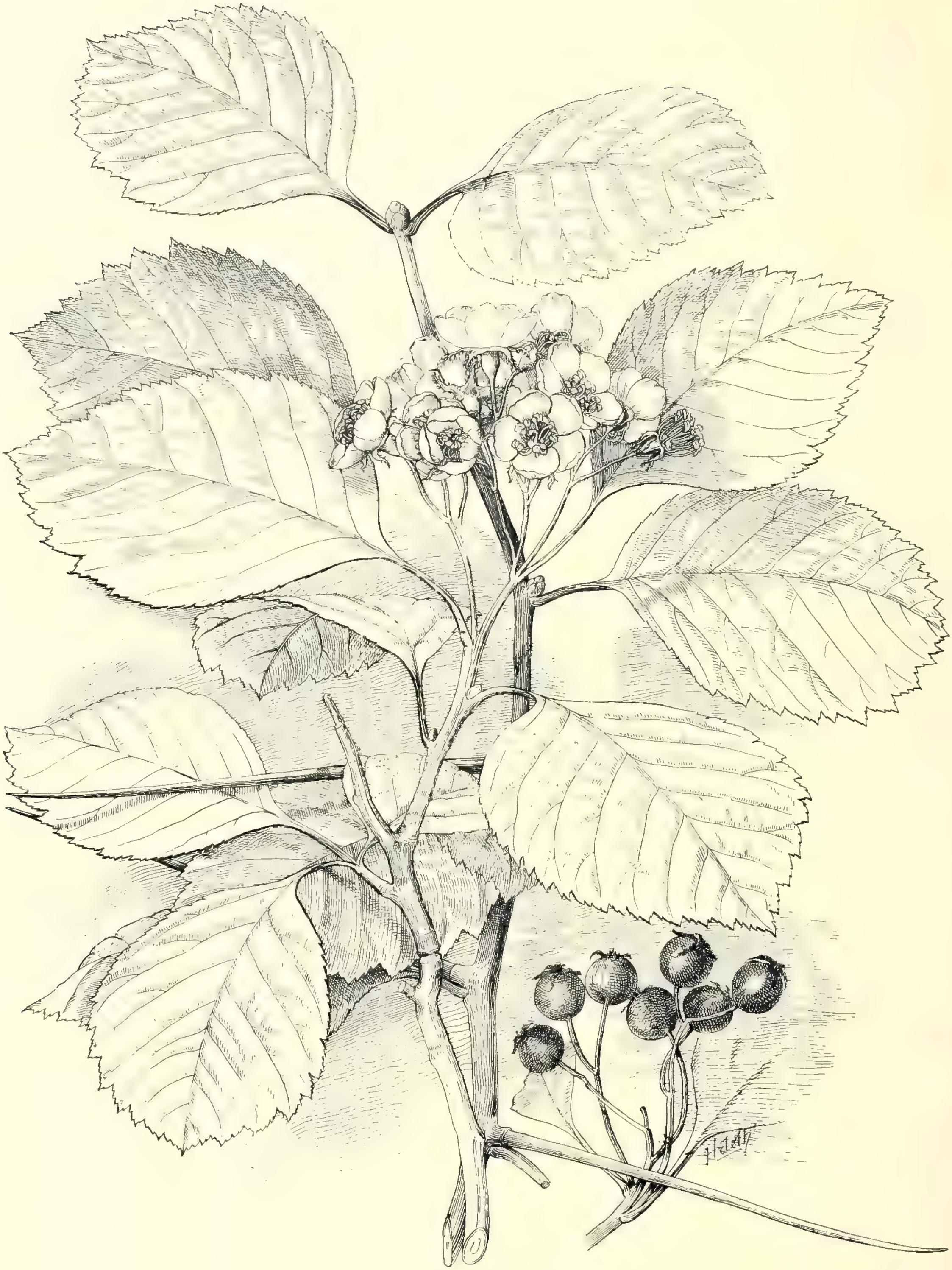
"But so long as the public and its agents, the dealers, continue willing to pay from 30 to 50 per cent. more for the whitened sepulchres offered them in the shape of sulphured fruit than for that which retains, with its natural flavor and sweetness, the natural tint of dried fruit, and with it the marks of careless or careful treatment, so long will the producer continue to supply the demand for the doctored article, unless, indeed, the law should intervene, as has been done in most European countries. There the sale of sulphured fruit is simply forbidden as injurious to public health, and as coming under suspicion of having been 'doctored up' from an inferior article with fraudulent intent. When, therefore, it is asked what I think is the proper policy to be pursued in this respect by a region which this year will, for the first time, come into the dried fruit market, I reply that I think the time has come to make a step forward and try to put upon the market a first-class article of 'unsulphured dried fruit,' with the express statement and claim that it *is* unsulphured and retains the natural sweetness and flavor of California fruit, instead of being reduced to a common level with the worst products of any other country. For it is certain that the whitish-green dried apples and pears now sold at high prices in our grocery stores might just as well have been grown anywhere from Norway to the Mediterranean for aught they teach of the quality of our fruits."

Judicious Sulphuring.

If sulphuring is done before the fruit is dried, little if any harm can come. To those manufacturers who desire to slightly improve the appearance of the product "with some regard to the fruit's palatableness," Professor Hilgard makes the following suggestions: "Large quantities of sulphur introduced at once into the drier or sulphuring-box will tend to cause a deposit of sulphur, in substance, on the outside of the fruit, adding its flavor to that of the acid, which alone is useful. The less sulphur put in at one time, and the more air admitted, the less there will be of the visible fumes that carry the sulphur up into the fruit. It is best to let the sulphur catch fire all over before putting it into the box at all. Let whatever sulphuring you must do be done before drying, as in that case not only will the drying process itself drive of a great deal of the superfluous acid and prevent it from penetrating the whole, but the flavor of the interior will penetrate outward and measurably do away with the laboratory odor that will otherwise pervade the fruit package.

"A very sightly and appetizing cinnamon-brown tint for sliced apples and pears may be secured by dipping, for a few minutes, the freshly made slices, contained in a properly shaped basket (of galvanized wire if desired), into a solution of salt, containing not less than two ounces in five gallons of water. This prevents any spotting where the fruit has been touched. Instead of the salt, a similar solution of the bisulphites of soda or lime may be used, which effect a slight external bleaching without injury to the flavor of the fruit.

"Last, but not least, let us try to gradually educate the public taste up to the point of preferring, in this matter, the substance to the shadow, and accepting healthy, brown, high-flavored dried fruit to the sickly-tinted, chemical-tainted product of the sulphur box."



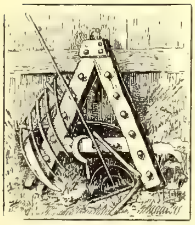
Long-Spurred Thorn (*Cratægus coccinea*, var. *macracantha*).

The American Garden.

Vol. XI. SEPTEMBER, 1890. No. 9.

THEN AND NOW ON THE FARM.

A RETROSPECT OF FIFTY YEARS, AND THE HOPE FOR THE FUTURE.

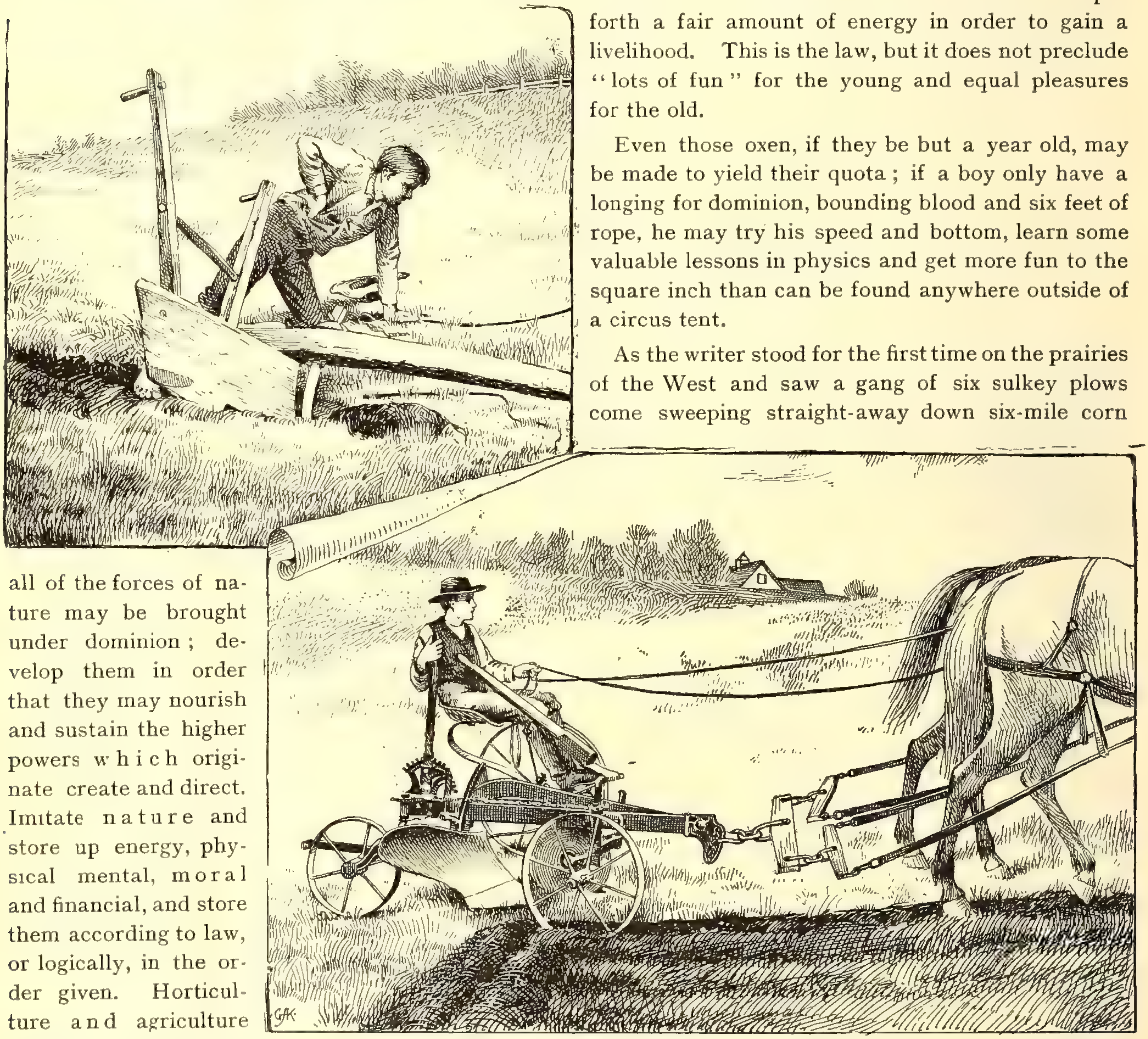


A BOY of twelve summers, clad in two curtailed garments of home-spun, reaching up to the handles of a Peacock plow which would persist in going into the beam after some neglected stone or beech root, or rise to the surface with the directness and speed of a brook trout, might have been seen on one of the tough clay farms of western New York, nearly fifty years ago. This boy was simply a type of hundreds who jerked at the single home-made rope line, and lustily yelled, "gee!" "gee!" or lay panting on the earth holding the aching side which in the gyrations of that "improved" plow, had come into too violent contact with those abbreviated handles. One lad at least used to wonder if the beam was made three times as long as the handles in order to give the boy the short end of the lever, so that he would not become lazy. It was rough, hard training those young lads had, but not entirely devoid of valuable lessons. Happily, one may get enjoyment out of hardships which lead to victories over difficulties, as well as from ease, which tends to enervate. As the world progresses, new and more difficult problems present themselves, and a good working knowledge of Nature's modes of action becomes more and more necessary. But no amount of knowledge will ever relieve mankind from the necessity of putting forth effort, which is the greatest factor of growth and development. Knowledge makes effort more effective, hence more pleasant. The lad on the sulkey plow is by no means idle; he has only substituted skill and watchfulness for an aching side and bruised toes. Fifty years ago, plowing was a constant warfare; to-day it is victory. The man who controls the binder must not sleep at his post, or the three powerful horses, so useful when subject to the direction of intelligence, may become forces of destruction.

A complex problem has been solved by inventive genius and the introduction of cheap horse power; watchfulness and training supplant the sickle and back ache, and the slight youth with gloved hands and alert eye accomplishes more than could a score of the old time hand reapers. Knowledge has been substituted for human muscle; or, more accurately speaking, the maximum of the former and the minimum of the latter have joined their forces, and all mankind is benefitted by their union.

Horticulture and agriculture are fast becoming sciences; in fact, they are sciences, and those engaged in them are already beginning to feel the gratification and pleasure of dominion. The man who plucked the wild fruits of the forest, which were pronounced good—and were as good as they could be under the conditions—has given place to one who now commands the knotty crab apple to bring forth fruit, large fruit, sweet fruit, red fruit, and it is so. He stands erect and proclaims to the myriad forms of life that he is a god within his sphere, that his authority comes in words that cannot be mistaken: "Let them have dominion over all the earth and over every living thing." He asserts his God-given right by making use of the appointed means, and the first unblemished fruits reward him for his obedience. He speaks, and golden grain takes the place of thorns and thistles. His fiat goes forth, and the animals yield up their lives; he commands, "multiply and replenish the earth," and the land flows with milk and honey.

Then or now; which will you choose, my young reader? If then, harden the muscles as the ox hardeneth his neck, and learn to be content with meager rewards. If now, train them deftly to execute the commands of their master in order that all of the forces of nature may be brought under dominion; develop them in order that they may nourish and sustain the higher powers which originate create and direct. Imitate nature and store up energy, physical mental, moral and financial, and store them according to law, or logically, in the order given. Horticulture and agriculture should be only the application in the most effective way of laws already operative. The man with the cultivator has somehow discovered that a straight corn row is shorter than a crooked one; that the time to kill weeds is before they grow, and that horse power and steel are more effective instruments of culture than bent knees and finger-nails. As he rides to church in his carriage he enjoys the rewards that come from the discovery and application of laws which are inexorable; laws which are helpful if controlled, hurtful if ignorantly or carelessly used. True! if he lose dominion of the high mettled horse, greater destruction will come than if the oxen leave the beaten road; but what American boy would exchange the former for the latter?

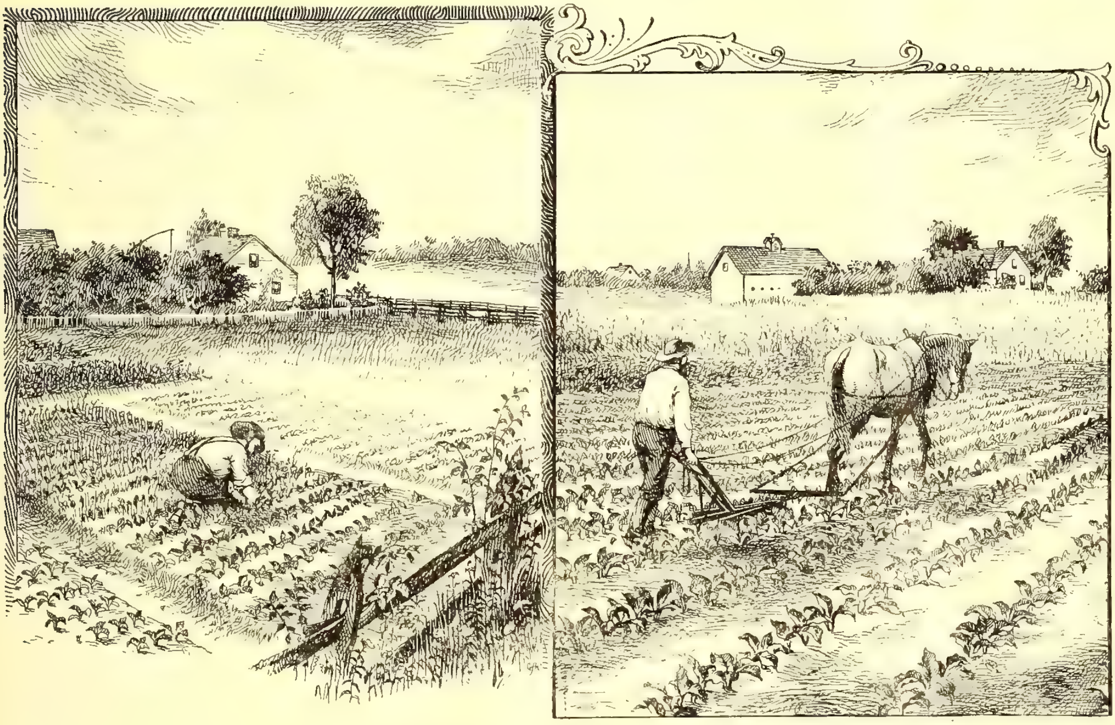


"Fifty Years Ago Plowing was a Constant Warfare; To-day it is Victory."

Ninety-eight per cent. of all the people of the world who are mature and able bodied have to put forth a fair amount of energy in order to gain a livelihood. This is the law, but it does not preclude "lots of fun" for the young and equal pleasures for the old.

Even those oxen, if they be but a year old, may be made to yield their quota; if a boy only have a longing for dominion, bounding blood and six feet of rope, he may try his speed and bottom, learn some valuable lessons in physics and get more fun to the square inch than can be found anywhere outside of a circus tent.

As the writer stood for the first time on the prairies of the West and saw a gang of six sulkey plows come sweeping straight-away down six-mile corn rows, and realized that every "bout" meant five acres cultivated, he could but look back to the time when a boy was given one of those hoes which were never sharp and never wore out, and was set to digging in that checker-board garden or in that inverted, clayey, undrained, blue grass sod, where a family of ten boys could find constant employment for two months. There are many of those old boys living yet who cannot take a long breath when they think of that time without getting a stitch in the side. Why those gardens were always made square and surrounded with *Rubus villosus* and *Prunus Americana*, no one was then able to explain; the modern political economist has discovered that it was for the purpose of saving the horse and giving an abundance of pleasant and cheap recreation for the entire family. Now the garden of the thinking man is long and narrow, and every thing is planted in straight long rows, and the trees and bushes are placed at one side by themselves, and “Dobbin” and one lad devotes two hours a week to it.


“Horse Power and Steel are more effective Instruments of Culture than Bent Knees and Finger Nails.”

Then April was selected as the most suitable month in which to haul out the farm manures and water—there was usually more of the latter than of the former. Why this month of all others was chosen we did dimly surmise, as we had learned that the first day of the month was ALL FOOLS day! But modern science has declared this notion apocryphal and has classified it with Washington's hatchet, marked it “N. G.” and pigeon-holed it. After careful research it has been decided that the time was chosen in order to economize wagon tire and furnish an acre or two of clods around the bars in order that the boys could learn what a valuable implement a maul is for setting free plant food and ameliorating clay land. It has dawned upon us in these modern days that manures are just as good without baptizing, and that in most cases best results are secured by following nature's hints; so they are spread, or should be, in the fall on the surface where there is a plant growing. Then apple trees were long-waisted and carried their heads high, ten feet to the first limb and thirty-five to the topmost branch; this, it is now supposed, was to keep the worms and the boys from getting at those leathery Pennocks; but more likely it was for the purpose of having on hand, free of cost, all styles of trapesia for family use. It is no wonder that Uncle Sam has won every war in which he has engaged; the eye and hand of his boys had yearly training in throwing those guinea-egg apples which nobody ever ate and which defied the rot for two years after they were picked!

Now that the trees have been better trained, they are more modest and the insects sing the old “saw,” paraphrased, “the early worm catches the apple.” Then, apples were dear at fifty cents per barrel in “shin plasters.” Now, three to five dollars can be realized for the best kinds of perfect fruit; but in order to secure it you will need to have constantly on hand a supply of Paris green, London purple and Bordeaux mixture, a patent pump, a half dozen improved nozzles, *et cetera*, and learn to use them at the right time. But in order to discover the kinds, times and seasons, a fair acquaintance must be made with the Hymenoptera, Lepidoptera, Coleoptera, Hemiptera, Orthoptera and all the omnipresent-optera, or, as many friends as enemies may be destroyed.

It will readily be seen that mere physical energy counts for less and practical knowledge for more, now than at any other period of human existence. There is no use of grumbling and looking backward, for the track is cold and the game is in front; it may be difficult to overtake, but if so, the pleasure is the longer and the reward the greater. The then, of the old cow pumpkins, sour grapes and wild plums has passed away. The now, of Reine Claude plums, at two cent each, Crawfords "cheap at five for a quarter," and Niagaras at ten cents a bunch, has been fully ushered in. A little sand, alkali, heat and skill, and they are preserved, and man partakes of food fit for the gods, without spot or blemish.

It may be asked, is this progress, or only an ingenious trick by which food is made dearer, "cornered?" It is found that little or no improvement can be made in plants or animals without improving their food; knowing the kind of food a nation consumes the stage of their cultivation can be accurately determined. The problem then was quantity; now, it is quality. Then, it was no uncommon thing to send two barrels of poor fruit to pay the freight of the third, which was no better.

The soil, the plant, the animal and law, these are the factors with which we have to do; even in this advanced age they are too often unknown quantities. The value of the X and Y must be discovered, or they must be eliminated, or they will eliminate the factor. Now we discover the secrets of growth and decay, reproduction and development, energy and work, in order that the lower and the grosser may be changed, according to the law of the correlation of forces, into the higher and more refined. Then the chief effort was to keep the wolf from the door and satisfy the protest of the land, as it called for justice, by declaring that one from three leaves three. The grandchildren have discovered the mistake, though they have too great respect for their ancestors and that ancient Dabol arithmetic to make much stir about it. Now the effort is to discover how the three sluggish units may be made to do the work of six, so that one from three will leave five.

But how is this to be done? By going on setting fruit trees in fence-corners and on stony, steep hillsides which have been impoverished by fifty years of cropping, and then leaving them to the tender mercies of the cattle and the myriad hungry insect enemies, subject to hunger and thirst till they look like Pharaoh's "lean kine," and need no Joseph to foretell that they are but the visible indices of a coming famine? The grandchildren educated to the rule of three will never learn how to prevent or combat these plagues, but they will soon be painfully aware that there are more of them than visited the Egyptians, and it will be strange if they do not imitate the Israelites, and pay themselves for their unrequited toil, by "borrowing" and fleeing to a land where physical law is observed and justice reigns. Happy for them if they flee before they have lost faith in the law which governs all nature's modes of dealing with man, and have somehow discovered that mind is above matter, that servants obey those who know how to direct, that discoveries are made by those who can see, and that seeing is the result of long and intelligent inspection! A fact may be found out by accident, but the putting of it to the best use can only be accomplished by one who has learned the laws applicable to the facts. A Pennsylvanian stumbled upon the telephone, but a Bell commanded it to transmit every sound, tone and inflection, and it obeyed.

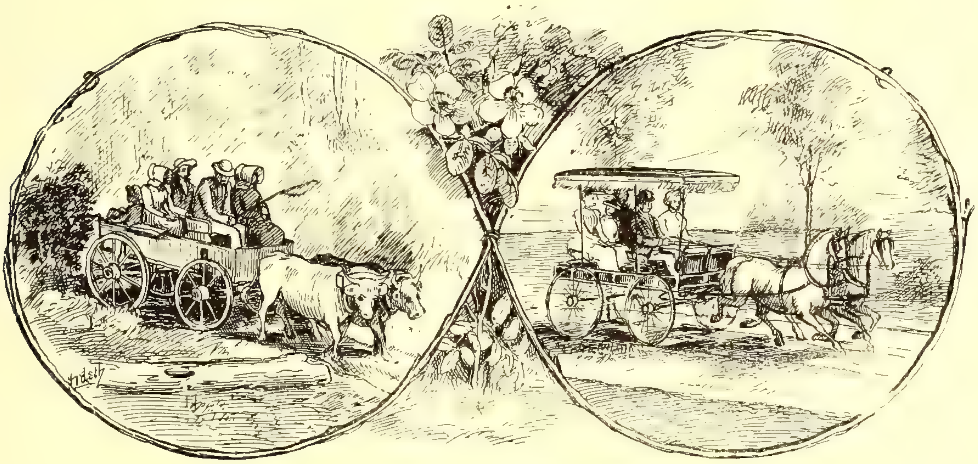
At first the land was very kind to the youthful nation; now she asks for the utmost skill of trained manhood. A soil capable of producing a good wheat crop contains in the first twelve inches from five to ten thousand pounds of potash, three to six thousand of phosphoric acid and three to eight thousand of nitrogen. In one case, it was found that of the 4,650 pounds of nitrogen in a soil, only sixty-three were available for the growth of plants. A crop of good Indian corn removes in ear and stalk from sixty to sixty-five pounds of nitrogen per acre, so that this fertile land could produce but one crop of corn, unless the inert nitrogen could be set free. A horse tied never so close to a locked granery full of oats will be none the fatter unless his owner have skill enough to pick the lock.

Every occupier of land has the usufruct right to these valuable elements of plant food, if he have the skill to take them from the soil; he may put them into circulation, *but he may not waste or destroy them.* The particle of matter liberated to-day passes into the plant which nourishes the animal which ministers to man's wants, and then is returned to the soil in a more available condition than at first! Dormant energy, which might as well not have been created for all the good it has yet done, is being put into circulation to be rotated through countless cycles. Then, we waited till the elements chose, in their erratic moods, to give an opportunity to thrust in the plow; now, opportunity is made by thrusting in drain tile.

Instead of gleaning the half developed fruits from weedy fence-corners, we transplant to the orchard, and dig, and dung, and graft, and command the plant to change its form and fruit; it does not always obey, because the laws which govern it are not fully understood. Plants of use and beauty are all about us, giving hints of their possibilities and impatiently waiting for an intelligent commander. For thousands of years they have kept their secrets well, and laughed to scorn the ignorance of their careless masters. Then, animals grew as they liked; now, they grow as directed, but always in harmony with law; but they say in unmistakable language, we obey not, nor yield, unless your intelligence is superior to ours.

Then, few opportunities were open for acquiring that knowledge and training which leads to mastery; now, all doors are open to those who will. Then, one man's head and another's hand were trained, often producing two mostrosities. Now, the head and hand are trained simultaneously; a thousand added comforts appear, innocent pleasures never dreamed of spring up, and the forces of Nature are chained to our chariot wheels. But the end is not yet; energy in the soil and the plant never yet utilized, impatiently awaits discovery and the unfolding of the laws which govern it.

Cornell University. I. P. ROBERTS.



THE LONG-SPURRED THORN—(*Cratægus coccinea* var. *macracantha*).

Fig. 1., Frontispiece.

Cratægus coccinea, Linn., var. *macracantha*, Dudley, Cayuga Flora, 33 (1886).

THE thorns are among the most varied and attractive of our native shrubs. They possess great merit because of their picturesque habits, as well as from the profuseness of their bloom and their interesting fruits. One of the most picturesque of all thorns is the recently named var. *macracantha* of the scarlet thorn, *C. coccinea*. The old plants attain a height of ten or twelve feet, and the top assumes asomewhat drooping or tortuous aspect, which is very characteristic. The spurs are exceedingly long, reaching four or five inches. The flowers are very fragrant, more so than any native thorn with which I am acquainted. It might be called with propriety the fragrant thorn. In this regard it is wholly different from the scarlet thorn, of which it has been held to be a variety. The scarlet thorn possesses anything but an agreeable odor. A bush of the long-spurred thorn in flower scents the air for a considerable distance.

But the dissimilarity between these two thorns in matter of fragrance is only one of several very marked differences, which, I think, mark the long-spurred thorn as a distinct species. At all events, it is extremely doubtful if the plant is closely related to the scarlet thorn. The wedge-based and furrowed leaves at once indicate that it is nearer the pear thorns (*Cratægus tomentosa*) than the scarlet thorn. Professor Dudley, who described and named the thorn in his flora of the Cayuga basin, N. Y., contributes the following note for this occasion upon the systematic position of the long-spurred thorn:

"General opinion concerning this thorn has associated it with the *C. coccinea* type, rather than with the *C. tomentosa* type of thorns; and no doubt its position is intermediate, connecting the two. After an examination, however, of a considerable series of specimens from Pennsylvania, New York, New England, and Quebec, one is brought to the conclusion that its affinities are with the pear thorn rather than with the scarlet thorn.

"With one exception, the pear thorn (*C. tomentosa*) is well characterised in the sixth edition of Gray's Manual. Instead of 'glands none,' the description should read, 'calyx lobes pectinately serrate and glandular,' as Torrey and Gray wrote it in the 'Flora of North America,' p. 465.

"Taking representative specimens of the pear thorn and the long-spurred thorn (our var. *macracantha*), they are found to agree very nearly in the general outline and size of the leaf, which is almost invariably contracted into a shortish stout petiole; in the lanceolate calyx lobes, abundantly pectinate and glandular; in the stiff, upright habit of the cyme in fruit, and in the usually narrow lanceolate stipules. The true *C. coccinea* has leaves thin, abrupt or cordate at the base, on slender petioles; its triangular-lanceolate calyx lobes are remotely dentate-glandular as a rule, often almost glandless; the cyme is diffuse in fruit, and the stipules usually broad.

"The typical long-spurred thorn, with its thick, shining, sharply serrate, wedge-shaped, nearly smooth leaves; very long spines; reddish, rather diffusely spreading branches; its large globose shining buds; its rounded head; dark, checked bark (less scaly on the old trunks than in the other two), and its small fruits, seems an extremely characteristic plant; but the fact that it varies with larger fruits and more abrupt, smooth leaves and shorter spines toward *C. coccinea*, with more pubescent leaves and shorter spines toward *C. tomentosa*, has been the chief cause of its long obscuration.

"Probably we have here a specific type, accompanied by the usual cratægi variations, as distinct as in *C. punctata*, *C. glandulosa*, Willd., may be its earliest name. But its present position need not be disturbed until after further observations of its variations, and until after old European herbariums, where it no doubt exists, as it does in European gardens, are carefully examined."

The long-spurred thorn occurs from the St. Lawrence river and New England to Minnesota. Its southward range is not determined. It should be introduced to cultivation, as it is beautiful and meritorious.—L. H. B.

GARDENS, BOOKS AND NATURE.

THEY who have spent the summer in a garden, with The American Garden as "guide, philosopher, and friend," have missed some of the best things that grew therein if they have gathered only the visible products of the soil. The garden is a great teacher, and all literature is replete with illustrations drawn from it, and from that broader garden in which is comprised all the larger effects of nature.

To cite instances in proof of this would be to give a bibliography of literature, to quote from volume after volume, to cover the whole wide range of poem and story and essay, for all utterances which have been designed to instruct, or to afford pleasure to the cultivated intellect, have almost invariably been compelled to borrow illustrations from the domain of nature, and to seek her aid to "point the moral and adorn the tale." The Prince among the teachers of men took for his lesson the sowing of the seed, the reaping of the harvest. A Virgil and a Bacon, the first of poets and philosophers, have rendered homage to nature and the garden. Artists must be in touch with the great garden of all animate nature, if they would move the sympathies of men. Millét, the peasant-painter of France, felt this when he said to Sensier: "Some tell me that I deny the charms of the country. I find much more than charms—I find infinite glories. I see, as well as they do, the little flowers of which Christ said that 'Solomon, in all his glory, was not arrayed like one of these.' I see the halves of dandelions, and the sun also, which spreads out beyond the world its glories in the clouds."

Millét, like all true artists, had a sixth sense—the sense of beauty. This was subject to and controlled by the same impressions and forces that make us cognizant, through the other senses, of pain or pleasure. He felt, and could interpret to others, the beauties of nature. He was able to make people hear "the songs, the silences and murmurings of the air." Millét's testimony regarding these "silent sounds" is worth noting. Some effect to despise this phrase, or at the best only allow the faculty of hearing these voices to be a dreamer's or a poet's privilege. But our own Whitman, who is a poet but no dreamer, of whom a critic has well said that he stands on his own ground with no man his leader as an interpreter of nature, has emphasized this intimacy with one of her phases in the line where he hears

> "The bravuras of birds, the bustle of growing wheat,
> Gossip of flames, clack of sticks cooking my meals."

Virgil's testimony is softer, smoother, less virile, but none the less true when he tells how

> "Soft whispers steal along the leafy woods."

At times these voices of nature speak to us with the blare and twang of instruments of brass; again with the silvery, dulcet tones of a lute, an Æolian harp. Now it is the gods in Walhalla sounding the funeral dirge; again the fairies tripping a fantastic measure in the wild wood.

That Whitman was true to nature cannot be better evidenced than by Thoreau's appreciation of his work, for Thoreau was by far the keenest observer of the moods and tenses of nature that the New World has yet known. Possibly, if the professional naturalist is excepted, he takes precedence of all others, here or elsewhere, now or in times past. He did not, like Linnæus, so minimize the study of nature as to say that a patch of moss no bigger than a man's hand would suffice for the study of a life-time, but he knew where and when the first bud started in the spring—what tree held the last leaf in the autumn. He heard the first notes of the *hylodes*, the first song of the robin as it came, the harbinger of spring, to the lonely cabin on the shore of Walden pond.

Lonely! did I say? Ah! never was the abode of man less so, for with Thoreau dwelt unceasingly the intimate spirits of the earth and air, and while they told him many of the secrets of their realms, they yet gave him grace to know that more was left untold, so that he did not say with Carlisle:

"It has come about now that the creation of a world is little more mysterious than the cooking of a dumpling."

In contrast to this is Emerson's infinitely truer thought, that "we learn geology the morning after the earthquake on ghastly diagrams of cloven mountains, upheaved plains, and the dry bed of the sea." While the tree is budding, the flower unfolding, we see only the bud and the bloom; the processes by which nature arrives at its fructification are too deeply hidden to be revealed to the eye of the finite observer. It is true that "we know in part."

Where nature is used as an aid to illustration in literature, it is almost always in her gentler aspect.

> "The violets
> That strew the green top of the new-come spring"

make a more seductive picture than the

> "——oak, whose boughs were moss'd with age,
> And high top bald with dry antiquity—"

albeit a less striking one. Not often is the grinning skeleton exposed, as by Emerson. Less often yet are we shown those phases by which the unsightly ordure of nature—cast off as a worn and worthless garment—becomes re-habilitated into a thing of life and beauty. Carlyle, never long content to dwell upon the purely or ideally beautiful, gives this picture of a battle-field, where

"——The kind seed-field lies a hideous, desolate place of skulls; nevertheless, nature is at work: all that gore and carnage will be shrouded in, absorbed into manure, and next year the March-field will be green—nay, greener. Thrifty, unwearied nature, ever out of our great waste educing some little profit of thy own, how dost thou, from the very carcass of the killer, bring life for the living?"

We find this thought also paralleled in Virgil, where

> "——th' Enanthian plains once more were strow'd
> With Roman bodies, and just heav'n thought good
> To fatten twice those fields with Roman blood"

True, it is, that in nature there is no waste. The dry leaf in the forest, the dead body of her great son, Man, are alike food for the building of next year's herbage and fruitage. "The withered leaf is not dead and lost. There are forces in it and around it, though working in inverse order, else how could it *rot?* Despise not the rag from which man makes paper, nor the litter from which the earth makes corn."

This idea has been beautifully touched by the graceful pen of Dickens. After the carnage of battle has made havoc of fertile English meadows, he leads us down through the fields that have become green again, where nature, "far above the evil passions of men, soon recovered her serenity, and smiled upon the guilty battle-ground as she had done before, when it was innocent. But there were deep green patches in the growing corn, at first, that men looked at awfully. Year after year they re-appeared, and it was known that underneath those fertile spots heaps of men and horses lay buried, indiscriminately enriching the ground."

It is not an unpleasant thought that this tenement of the soul may be made to yield good wholesome corn for the nourishment of other men after we have done with it. Hawthorne has carried the thought farther, and used the poet's license to give it sentiment. In "Septimus Felton," the strange flower *Sanguinnia sanguinissima*, growing from a grave, contains a vital essence that rightly distilled and compounded becomes an *Elixir Vitæ* to the seeker after immortality.

It would be difficult to find a literary worker, especially one who has made his personality felt in any degree, who has not testified his love for, or obligation to nature, if not directly, then at least by inference. If he has not gone to the woods and the fields, the mountains and the streams for inspiration, he has at least asked them for the machinery with which to carry it along, and without which it would have trailed in the dust.

Among the small minority who have not glorified the great god Pan, the gentle Elia must be classed. Lamb loved men and city streets. He hated the country almost as much as he did his desk at the India House. To him a garden was "the primitive prison, till man, with Promethean boldness and felicity, luckily sinned himself out of it."

It is unnecessary to point out the prominence now given by certain writers to verbose descriptions of natural scenery. Half a century ago Carlyle noted the coming wave, and flung his gibe at it. "Sometime before small-pox was extirpated," he says in "Sartor Resartus," "there came a new malady over Europe—I mean the epidemic of view-hunting. Poets of old date, being privileged with senses, had also enjoyed external nature, but chiefly as we enjoy the crystal cup which holds good or bad liquor for us. * * * * Never, as I compute, till after the 'Sorrows of Werther' was there man found who would say, 'Come, let us make a description; having drunk the liquor, come, let us eat the glass.'" Yet, after all, this scoffer yielded to the inevitable, as witness the beautiful description of the house-garden where Blumine, the flower-goddess, presided.

In a description of an aspect of nature, the superlative is often given undue prominence by many of our modern story-tellers. They seem trying to emulate the Spaniard that Southey tells about, who always put on his spectacles when about to eat cherries, that they might look bigger and more tempting.

All literature acknowledges the beneficent influences of nature upon the formative character of youth, when the elements are plastic, easily molded. In his "Winter Garden" Kingsley shows the restraining influence that it may have over the developed man. He, too, "had once felt that strange lust after the *Burra shikar*—the thirst for excitement and venture. But on a little patch of English moor, into which he had struck his roots as firm as the wild fir trees, he had learned the lesson of the old collect to 'love the thing which is commanded and desire that which is promised.'"

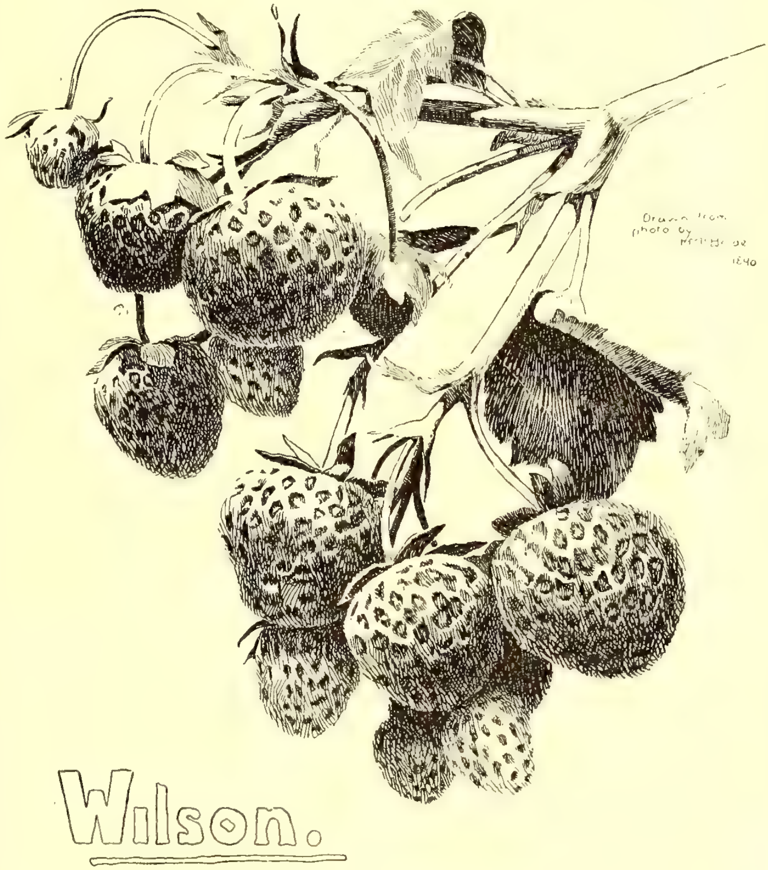
James K. Reeve.

THE WILSON STRAWBERRY.

AN EXPERIENCE MEETING TO DISCUSS ONCE MORE THE MOST FAMOUS OF AMERICAN STRAWBERRIES.

STRAWBERRIES are always interesting, from whatever direction we regard them. We love the white blossoms in the sweet new spring days, we admire the long, straight, cozy rows, and who does not dote upon the great, plump, sweet berries? We distrust the man, or woman either, for that matter, who does not love strawberries. So we look with a species of veneration upon the old Wilson's Albany, which divides with the Hovey the honors of making American strawberry-growing the magnificent industry which it has now become. The Hovey has almost passed from sight, although it has held its fifty years nobly against the horde of modern striplings. But the Wilson disputes every inch of ground which these younger generations are usurping, and it even sometimes asserts itself as still the reigning king of the strawberry world. So we have asked our friends to tell us what they know about it to-day—if it is still profitable, if it is running out.

From J. M. Smith, Green Bay, Wis.—"In 1861 I obtained my first Wilson plants. Since that time I have, with the greatest care, kept them pure. I have repeatedly obtained new plants from others whom I considered good growers, and set them upon my grounds, but entirely separate from my own. They failed in every case to do as well as my own, and after a fair trial were all destroyed. During all these years I have studied the habits of the plant very carefully, and think that I have learned many things about it that have aided me in obtaining much better average crops from it than from any other variety that I have tried, and they have been many. Firstly, it requires very rich land, and I do not think it possible to grow a large crop on poor, or even on a moderately rich soil. Secondly, it is not a strong grower as compared with Crescent, Warfield No. 2, or even the Bubach or Jessie; hence the necessity of setting the plants closer together than most, if not any other variety that I have ever grown. Thirdly, I can make the beds yield but one large crop; hence the necessity of setting new beds every year. By large crops I mean not less than from 200 to 300 bushels per acre. For quite a number of years past the average yield has been considerably more than the amount first named. Fourthly, I cannot make them yield a large crop by resetting the same ground year after year, but use the land for other crops two or three years between the strawberry crops. Neither do I take runners from plants that have been exhausted by bearing a large crop of fruit. I set plants in the spring, and when they come into bloom, as many of them will, I remove all the blossoms and keep the entire growth in the young plants until they commence throwing out runners. These runners are trained around the parent plant at nearly equal distances, thereby preventing their being crowded together. The result is a set of strong healthy plants, and from these beds are taken my plants for the next spring's setting. They are cultivated very carefully and are protected during winter. Such, in brief, is my plan with the Wilson. I have only once failed to have at least a paying crop, and then it was my fault, and not that of the plants. My sons, as well as myself, consider the stock stronger and better in every way than when we obtained it in 1861. It has been my main reliance ever since it came into bearing, and seems likely to remain so, and if I could have but one variety, I should not hesitate for a moment to take the Wilson."



As Grown in New York in 1890.

From T. T. Lyon, South Haven, Mich.—"The Wilson strawberry has, from the incipiency of commercial small fruit culture in this Lake Shore region, stood nearly or quite at the head of the list of profitable varieties, and has not yet quite lost its hold upon growers and dealers. For years the dissemination of newer varieties has been slowly, but surely, undermining the popularity of this old favorite, prominent among which have been the Crescent, the Sharpless, the Mt. Vernon and more recently Haverland No. 2 and possibly Jessie. Still there are yet many planters who adhere with unyielding tenacity to the old-time preference for the Wilson. It has almost invariably been grown in matted rows, three or four feet from center to center, with a space between, kept open by the cultivator, wide enough for the accommodation of pickers. Occasional growers, however, especially on light soils, keep the plants in hills, planting in checks, rowing in both ways and cutting off the runners, and admitting of cross-cultivation. The preferred practice seems to be to secure but a single crop of fruit from a plantation, which is then plowed under, a new plantation having been made, in spring, upon fresh ground for the succeeding season's crop. The persistent attacks of certain fungi, to which this variety has been liable, may have much to do with its alleged 'running out,' and these attacks may, perhaps, be largely due to neglect in cultivation. The fact of the eminent success of J. M. Smith, of Wisconsin, as well as that of various other superior cultivators, would seem to afford ground for the suspicion that much of such apparent failure is rather the 'running out' of the fertility of the soil, than of the original capacity or vigor of the plant itself, a theory of which Thomas Andrew Knight appears to have been at least the foster father, but in the correctness of which we entertain but a halting, doubtful faith."

From Thomas Wilde, Ottawa Co., Mich.—"Thirty years ago the Wilson grew large and bright under any treatment. We planted close, in rows four feet apart, and after planting, cut close, raked, and cultivated with horse. At present, it is quite dark and about half its former size, and stands the lowest on the list of commercial berries. A fair crop can yet be grown by the liberal use of ashes, but the Cumberland, Bubach, Warfield, Crescent, and Sharpless supersede it. All prominent growers in this part of the state believe that it has 'run out' beyond hope of resurrection. The Wilson berry was a God-send, but it is now eclipsed by new varieties having health, vigor, productiveness and beauty which far surpass its present condition."

From W. A. Brown, Benton Harbor, Mich.—"The first strawberries from St. Joseph, Mich., for the Chicago market were grown in 1862. The Hovey, Early Scarlet, Peabody and Wilson were planted. The Wilson soon took the first place and held it firmly against all the new varieties for nearly 25 years. In Berrien county, since 1868, there have been from 2,000 to 4,000 acres planted in strawberries, nearly all being of the Wilson. About five years ago the blight made its appearance in the southern part of the county, and in a year or two it extended northward, destroying all the large strawberry plantations. These have generally been replaced by the Crescent. A few still plant the Wilson for the purpose of fertilizing the Crescent. Last year less fungus than usual appeared, but this season heavy rains before the fruiting caused its re-appearance. A great contrast in vigor is now manifest between the Wilson and Crescent, but the latter is proving unsatisfactory as a shipping berry. It is evident that both varieties must soon give place to some of the numerous new varieties, several of which are very promising."

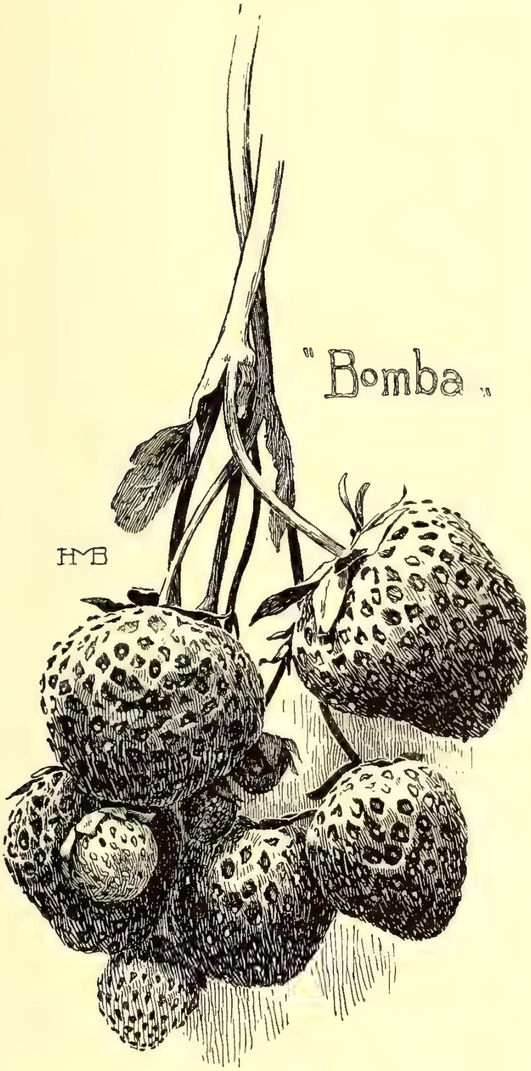
From Matthew Crawford, Cuyahoga Falls, O.—"The Wilson strawberry succeeds as well with me as it ever did, except that it and many others receive more injury from the rust now than formerly, not because they are more susceptible to it, but it is more prevalent. I grow it only in a small way in matted rows, always covering it with straw in the winter. It is grown to a very limited extent in this locality, having been displaced by the Crescent, Cumberland and others that either yield more with the same amount of labor or bring a better price. I do not think it is running out, but our standard is now too high to be satisfied with this variety."

From W. J. Green, Experiment Station, Columbus, O.—"The Wilson strawberry does not succeed here. We have grown it in matted rows, giving thorough cultivation. The plants were mulched in the fall, and the mulching was allowed to remain until after fruiting. In comparison with other varieties, it stands at the foot of the list in this locality. The cause of its failure here is the strawberry rust, which attacks the foliage. The rust is more troublesome in this locality than in many others, hence such varieties as Manchester, Capt. Jack, Wilson, and many others cannot be grown here. The Wilson is still grown with profit in more favored parts of the state, and I have no direct evidence that it is running out. The rust is probably more prevalent than formerly, which may account for the fact that the Wilson fails where it once was profitable. Various other causes have operated to make it unpopular, such as competition with improved varieties; low prices, which necessitated the growing of large berries; the efforts of plant dealers to magnify its faults in order to show the virtues of their pets. Wherever the Wilson succeeds and meets the demands of the market, it is still largely grown."

From C. A. Green, Rochester, N. Y.—"The Wilson has long been a favorite, owing partly to the great reputation it secured at an early day when it had but few competitors, and partly to its productiveness and vigor. Its peculiarity of turning red when hard and immature enables it to bear shipment and hold its shape when canned, and also adds to its popularity. Its great defect here is a tendency to leaf blight, which often appears suddenly and reduces the yield more than one-half. Where the Wilson does not blight and receives good culture, it is yet a profitable variety, rivaled only by the Crescent and the Warwick. With poor culture, the size of the fruit dwindles after the first picking. It has been somewhat difficult to get Wilson plants unmixed; owing to its having been used to fertilize Crescents, Crescents have intermixed. In order to secure absolute purity, and to improve the strain if possible, I have propagated all from one plant, bearing superior fruit. The results are not very encouraging as regards superior fruit. The Wilson is not called for by planters as often as formerly. This may be partly owing to the fact that it is not pushed in catalogues, but I conclude, on the whole, that it is superseded by varieties possessing better color, better quality and larger size."

From E. Williams, Montclair, N. J.—"I tried the Wilson when it was first introduced. It proved unadapted to my soil, taste, or idea of what a strawberry ought to be, a concentration of acidity in the appearance only of a strawberry that sugar seemed powerless to neutralize. If allowed to hang until crimson, to get ripe, it was invariably rotten. Years afterward I was induced to give it another trial from its success in Monmouth county, procuring pure stock plants from there, which, though proving to be more vigorous, were not the true Wilson. I do not know of any Wilsons being grown in this vicinity or county now. The Downing superseded it years ago, and is still retained by many, though it has failed to a large degree from rust. Finally, the Wilson has no standing in this locality. It was run out years ago."

From J. H. Hale, So. Glastonbury, Conn.—"My first venture in strawberry culture was more than twenty-five years ago with Wilson's Albany, Hovey Seedling, and two or three others, and ever since that time I have been growing the Wilson, and have tested every other variety that has been offered for sale, besides many seedlings of my own and a great number of others sent here for trial. We have berries more nearly perfect in plant growth, more productive varieties, larger berries, better colored berries, berries that suit the masses better to eat, yet none quite equal to the Wilson in shipping and keeping qualities. For fifteen or twenty years past I have been fruiting from 10 to 25 acres of strawberries annually, and each year tested from 50 to 150 varieties, and thus far I have failed to find a berry that combines so many good qualities as did the Wilson in its best days—vigorous, hardy plant, strong staminate bloom, early ripening, great productions, good size and form of fruit, great firmness, rich, dark color and good quality. (On this latter point I know many will be inclined to differ with me; yet I know of no berry now growing that has such a rich sprightly flavor as a fully ripened Wilson.)



(See page 521.)

"Within the past three years I have visited during the strawberry season twenty states of the Union, and have been on the farms of some of the most successful cultivators of the strawberry in each state, and in not a single instance have I found the Wilson coming up to its old standard, or proving as reliable or as profitable as some other varieties. J. M. Smith, of Wisconsin, and Dr. McKay, of Mississippi, are the only parties in the United States that I know of who are able to make much of a success with it of late years, and still from all over the country we have a heavy demand for the plants each year, and other growers of small fruit plants tell me that they sell many Wilson plants annually; yet the show of fruit in many of our leading markets for the past five years does not indicate that these plants ever produce much marketable fruit.

"I recently addressed a letter to a hundred or more of our customers in different parts of the country who had bought Wilson plants of us during the past year or two asking why they had planted this variety. Over 70 per cent. replied in substance that they had better and more profitable varieties, and 'only used the Wilson because it bloomed so early and so furnished pollen to fertilize the blossoms of their early imperfect flowering varieties.' A few wanted to 'give it one more trial and see if it would not do as it did years ago;' others had 'heard of its value and wanted to test it;' one or two 'liked it to eat better than any other," and two planted it because they 'had a demand for the fruit for canning purposes.' All agreed that they were growing more profitable varieties, and mentioned Bubach, Haverland, Crescent, Windsor and Warfield as better sorts, about in the order named.

"Some eight or ten years ago I conceived the idea that the deterioration of the Wilson was caused largely by careless methods of propagation—the taking of plants from old beds, etc.—and concluded that if I could once obtain an improved or well selected strain of plants I could by selection in a few years breed up to the old-time vigor and productiveness. From near Albany, N. Y., I finally obtained a stock that had been carefully propagated for years. From this stock I have each year selected the best for planting stock, and believe that I have to-day the best strain of Wilsons in the United States. The plants are strong and lusty in growth, very seldom showing any signs of rust or leaf blight. The bloom is perfect, and the fruit sets well, yet does not come up to the old time standard, either in size or color. I have become thoroughly satisfied that it has 'had its day,' and that it is worse than useless to attempt to revive it, except through its seedlings, or better still, through the seedlings of such vigorous pistillate varieties as the Haverland, Bubach or Crescent, that have been fertilized with it. The offspring of such crosses should in some degree show some of the old time characteristics of this once valuable variety, unless it is so far gone now as to be unable to transmit any of its value to its offspring."

From F. S. Earle, Cobden, Illinois.—"We discontinued planting the Wilson strawberry on our Southern Illinois fruit farm some ten years ago, as it ceased to be profitable, and at this time very few fields of it can be found in this region. We usually grew it in narrow matted rows. It did no better, perhaps hardly so well, under hill culture. I have always considered it an open question whether the Wilson was really 'running out,' that is, becoming constitutionally weaker, or whether its failure was not rather to be attributed to the greatly increased ravages of insects and fungi. In our experience, it was found particularly subject to injury from the tarnished plant bug, the various root worms and the leaf blight and rust (*Ramularia Tulasnei*, Sacc.), and we were forced to discard it for more vigorous or better resisting varieties. It seems probable that its wide spread failure is to be attributed in part to each of these causes."

From T. V. Munson, Denison, Texas.—"Some ten or twelve years ago, E. Perry, one of the foremost fruit-growers of this region at that time, and several other persons, grew the Wilson strawberry quite extensively on a deep sandy soil, having a moist substratum of clay. The variety did well with them then in comparison with Downing and some others, except when a season of drouth came, and then the berries would not develop to large size, nor ripen well. The plants made excellent stools and set fruit heavily. They were grown in matted rows. In a few years the Capt. Jack and Crescent proved so much more certain bearers, and more prolific on these grounds, as well as on others of similar character, that now they have entirely superseded the Wilson.

"On my own place (at that time a rich, dark limestone soil), the Wilson made immense stools and bloomed profusely, setting many berries, some perfect and some 'buttons,' but invariably failed to mature well, making a very indifferent crop in matted rows and hills; while Capt. Jack and Crescent, planted alternately in matted rows, have been our leading market varieties for some fourteen years in both sandy and clay lands, and are yet doing well, though the Parker Earle now bids fair to supersede them, being perfect in flower, and finer than either Crescent or Capt. Jack in berry and plant, as well as more productive. I have tried nearly all kinds. I cannot say that the Wilson is 'running out,' but surely it has been *run out of cultivation* here by more profitable varieties. Probably it comes nearer the mark to say that more profitable varieties (owing to greater productivenes) have superseded the Wilson, though the latter may be as good as ever, and is, so far as my knowledge goes. I do not believe in the theory of 'running out,' in varieties which propagate themselves naturally, as do strawberries."

[REMARKS BY THE EDITOR.—The above replies indicate that the Wilson is going out of general cultivation. The reasons for this disfavor fall into two categories: depreciation of the merits of the variety, and failure in the variety itself. "Competition with improved varieties, low prices which necessitate the growing of large berries, the efforts of plant dealers to magnify its faults in order to show the virtues of their pets," as Mr. Green pungently writes, are prime causes in the growing disfavor. Our standard of strawberry ideals is growing away from the old Wilson, and we predict that when another quarter century shall have come it will live only in history, as does the Hovey to-day.

But is the Wilson running out? This is what everyone wants to know. Our own experience, and the testimony of growers in general, indicate that the berry is not so good as it was in its younger days. We presume that even Mr. Smith will agree with us that this is the general truth regarding the Wilson. It is only an occasional grower who puts energy enough into the variety to make it hold up its head among its fellows. In short, the Wilson *is* gradually failing, running out, and the experiences of those who still maintain its virtues by dint of forceful culture are the clearest proofs of the fact. In ordinary treatment it is no longer profitable, and it is to be expected that failure will be longest delayed where conditions are the most perfect.

But we suspect that under these intensive cultures and close selections the old Wilson is disappearing and a new Wilson is coming in. In fact, Mr. Smith says that even now he considers his "stock stronger and better in every way than when we obtained it in 1861." It is the inevitable tendency of such practice to breed a superior strain, a new variety. This reminds us of a statement which we recently made that the Trophy tomato is running out; whereupon one objected to the statement with the observation that a certain gardener had grown only the Trophy since its introduction in 1868, under high culture, and so far from deteriorating, it had actually improved—thus furnishing undeniable proof of the truth of our proposition."]

* * *

Taste is pursued at a less expense than fashion.—SHENSTONE.

AMONG THE STRAWBERRIES.

NOTES AND OPINIONS OF THE SEASON.

CENTRAL NEW YORK.—While the testing of varieties of fruits and vegetables is among the most difficult and unsatisfactory work that can be done in the way of experimentation, owing to the multitude of elements which affect conditions and results, and the difficulty of forming correct judgments, it may be of interest to note something of the behavior of new and old strawberry friends which I saw at the Cornell Experiment Station, the past season. The plants are growing on very heavy stiff clay ground, which so far as known had never been manured previous to 1889, and from which a commercial grower would hardly feel like attempting to get a profitable crop. Yet good opinions could be formed of all the sorts under trial.

Bomba. Habit low to medium ; foliage good but not very abundant ; trusses weak ; berry large, round conical, later ones quite round ; color dark ; in texture it is hollow and rather too soft for shipment, being a poor keeper ; its flavor is excellent ; season medium, productive. Holds out well, the later berries being of fair size and attractive. Good for the home garden. The figure on page 519 shows a cluster, natural size.

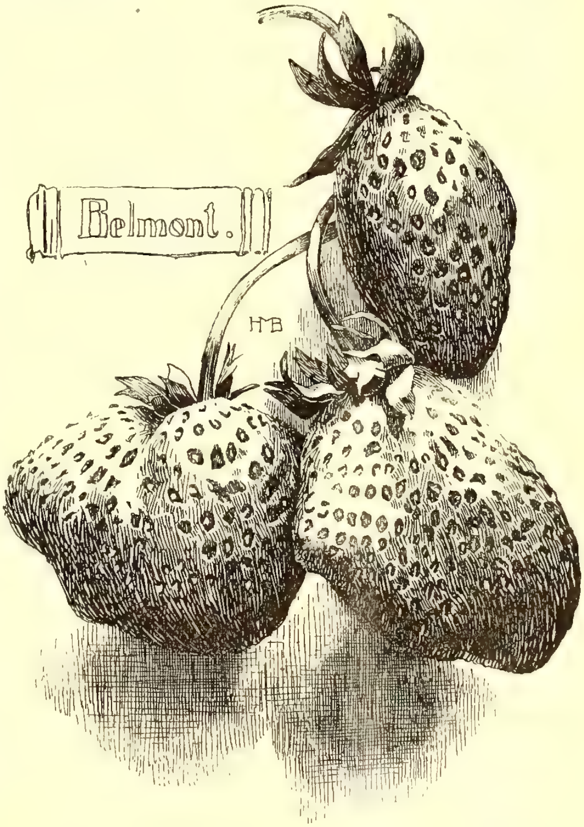
Ohio. High ; foliage vigorous ; trusses long, good ; berry of medium size, slightly necked ; color light ; firm and solid in texture, sour. Late, fairly productive and holds out well. Nothing in particular to recommend it except lateness. Practically identical with Kentucky.

Miner. Habit low to medium ; foliage firm ; trusses short, mostly prostrate ; berry medium size, conical, bright, a little soft but not hollow ; flavor fairly good. Season medium ; fairly productive.

Haverland. High ; foliage vigorous and healthy, leaves thin, light colored, comparatively exempt from blight ; trusses long, weak, mostly prostrate in fruit ; berry large, long, conical, somewhat necked, bright scarlet ; colors evenly throughout ; texture fairly firm, solid ; flavor deficient ; very productive. It is an early variety, but continued to give good berries among the latest, and held out its size and attractiveness better than most sorts. Its shape is not pleasing in many cases and its color is too light to be most attractive on the vines, but would probably appear to better advantage after being shipped or standing some time than a darker colored berry, for it has not the whitish unripe appearance often shown by Sharpless. From the indication here it seems to be one of the most promising as a general market berry. It is not sour like the Wilson, but gives one the impression that even Dame Nature herself was surprised at the number of berries, and had not provided enough flavoring material, and consequently was obliged to dilute it, as it is deficient in quality. The accompanying figure, page 523, shows a couple of average clusters, natural size.

Mineola. Habit low to medium ; foliage tough, leathery ; trusses rather stout ; berry medium to large, short, inclined to double points ; later ones obconical, with a pronounced neck ; color dark, uneven ; moderately firm, flavor good. Season medium to late ; not overly productive, but gave a fair number of large berries ; crop soon gone, last berries very irregular.

Wilson. Habit low ; foliage rather scanty, unhealthy ; trusses short, prostrate in fruit ; berry small to medium, round, short conical, dark, firm, solid, sour. Not as vigorous a grower as most other kinds, and very subject to leaf-blight. While this berry has done such excellent service in advancing strawberry culture throughout the country, it is very evident that there has been decided progress in the production of better varieties, and that this must be left behind. While it is no doubt much benefitted by good breeding and treatment, it does



not seem probable that it can be made to excel those varieties which stand so much ahead of it here, when they are given the same special care. It appears analogous to breeding up a dairy from natives in preference to thoroughbreds.

Bubach. Habit medium to high; foliage dark, tough and vigorous, apparently very healthy; trusses short, fruit close on the ground; berry large, short, usually flattened or irreguar; color bright; hollow, sweet, very good; season early to medium.

Miami. Habit medium; foliage good; trusses loose, held fairly well; berry large, round-conical, short, slight neck; color bright; fairly firm, hollow, core rather hard; flavor fair to good; season early to medium. A fair crop of good sized berries.

Lida. Habit medium; foliage strong, comparatively healthy, less subject to blight than most of the other good varieties; trusses good, well held; berry medium to large, flattened or round conical; color good; a little soft but solid, flavor excellent; season medium to late. Productive; promises well for home use or near market.

Warfield. Medium to high; leaves thin, appears to blight fully as bad as Wilson; trusses short, compact; berry medium to small, round-conical with distinct neck; color dark, attractive, firm and solid; flavor mild, a little sour; season early to medium. Produced an enormous number of berries, most of the later ones running small, but held out in size rather better than Crescent. May prove a valuable berry in some sections.

Jewell. Low to medium, weak grower; leaves thin, fairly healthy; trusses short, fruit close to the ground; berry large, short-conical to flattened, bright color, fairly firm, solid, flavor good; season medium, fairly productive. Holds out the size of its berries remarkably well.

Windsor Chief. Medium height; foliage fine, healthy, having a silvery bloom peculiar to itself; trusses loose, fairly held; berry medium size, good to the end; short-conical or flattened; color dark, good, firm and solid, rather sour but good and sprightly; season medium to late; productive. One of the older berries which still compares very favorably with most of the later introductions.

Logan. Low to medium; foliage thin, strong; trusses short; berry large, round to conical; color bright, very attractive, moderately firm, solid. One of the best in point of flavor; early to medium.

Hampden. Low to medium; foliage dark, strong and rugged, more subject to blight than some others; trusses fairly long, compact, good; berry medium to large, short conical, color rather light; fairly firm, flavor very good; late; promises to be very productive and good. Holds out in fruiting very late, but most of the last berries are small and unattractive.

Belmont. Medium height; foliage thin, good; trusses long, slightly straggling; berry large, holding out its size well, long, conical to flat, rather dark, fairly firm for so large a berry; flavor first-class, sweet; late. A little inclined to light colored tips. Promises well for home use or near market. Gave a good crop of large berries. The cut, page 521, shows common forms of Belmont, full size.

Crescent. Low; foliage thin, good; trusses short, compact; berry small to medium, short conic or flattened; light crimson, firm, solid, rather sour, not equal to many in flavor; early market. A good companion to Warfield in size and productiveness.

Itasca. Low to medium; foliage fine, leathery; trusses short, straggling; berry medium size, short, rounded, necked, color medium bright; fairly firm, hollow, flavor excellent; late. Fairly productive, and holds its size reasonably well.

Jessie. Medium height; foliage thin, vigorous and healthy; trusses straggling; berry medium to large and holds out well, round conical or tapering at both ends, dark, firm; solid, flavor excellent; early. Picks rather hard; fairly productive; fruit soon gone.

Louise. Low; foliage thin, with tendency to curl upward; trusses long, compact; berry large, conical to irregular, light, fairly firm, solid, flavor sprightly good; very late; promising; apparently productive.

Downing. Medium height, foliage thin, blight bud trusses apt to be weak and straggling; berry medium size, conical, regular, light, not very firm; solid. Its flavor has long served as a standard of excellence, but is fully equaled by Logan, Gold, Jewell, Itasca and others. Late; lacking in vigor.

Gold. Medium height, foliage strong, good grower; trusses well held; berry medium size, roundish, short, light; texture firm, solid and meaty, flavor excellent; late. Too few plants for a reliable opinion, but gives good indications, especially for home use. In texture and flavor it is unsurpassed. Gave some good berries very late in the season.

Gandy. Low; foliage firm, good; trusses long, good; berry large, long conical, slightly necked, moderately firm; flavor excellent; late. Its tendency to white tips appears to be its worst fault. Gave a few good berries late in the season.

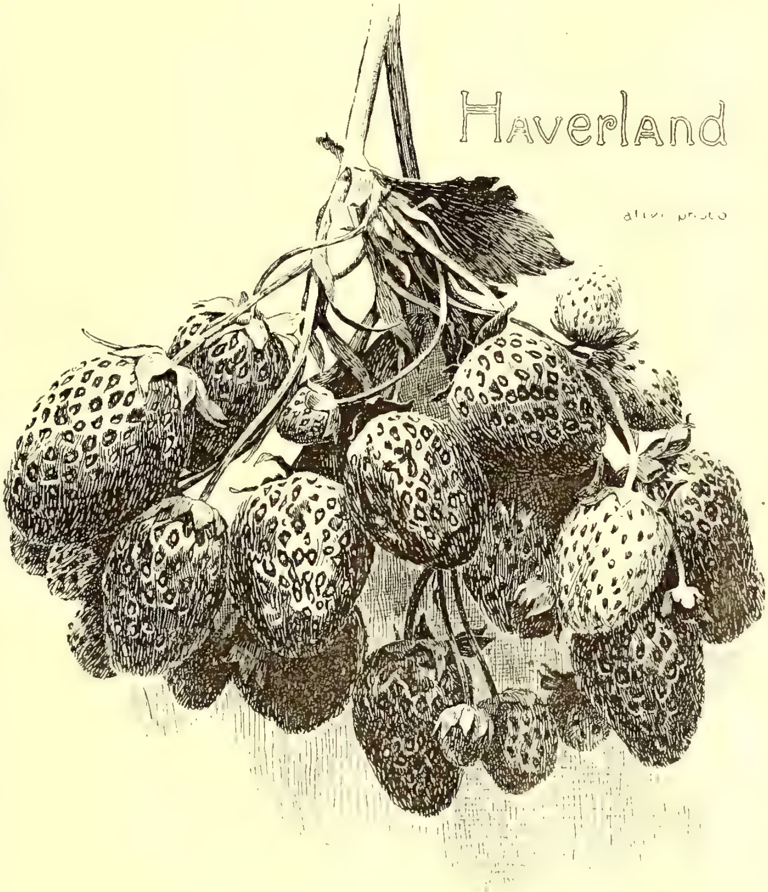
Cloud. High; foliage ideal, firm, dark and vigorous; trusses long, stout; berry medium, short, conical, flat tipped, light crimson, firm, rather sour; a typical Crescent in flavor and appearance; very late. Few stools gave more than one fruit cluster, and many none at all. It is hard to hull, as the hulls are set deep and cannot be removed without jamming into the berry. The most beautiful foliage in the field, but seems to fail in productiveness here. FRED. W. CARD.

NORTHERN JERSEY.

The strawberry season of 1890 with me, as compared with that of 1889, has been abbreviated at both ends, commencing three days later and ending three days earlier.

Jessie and Pearl were my principal varieties, and they came in together on the 5th of June, when they yielded a clever picking, though I first picked ripe berries of both and of Bubach on the 3rd, and could doubtless have done so on the 1st, had the birds not insisted on the first samples. The Pearl I still like the best; it is of such good quality, uniform shape and size, and as handsome as it is good. The berries are uniformly perfect from first to last, and while the Jessie makes more of a show when in blossom, the Pearl is not one whit behind it in productiveness.

The Jessie on my grounds has a bad habit of ripening unevenly; many berries presenting a dark crimson side next to the sun will be white on the other side, necessitating a look at both sides to insure picking only ripe ones. Mr. Green informs me that at Rochester it shows no such defect. Can this be attributed to soil or climate?



At the nurserymen's convention a friend asked me if I had not found the Jessie mixed. The fear that it was had prevented him from setting it. Of my first plants, which came in bad order, I saved but a small per cent., and among these I noticed a few showing such a different habit of growth, and as I thought, difference in foliage, that I suspected they might not all be true; but on calling the attention of others to them at different times we concluded that it was due to a difference in soil or location, and accepted them all as genuine. As the plants multiplied I set a larger bed, and this season I notice occasionally berries of a different shape, color and appearance from others, with no tendency to uneven ripening. This fact, in connection with the query of my friend, excites a suspicion again that possibly there may be some admixture of varieties, but in my bed I can not notice enough difference in the plants, as they are *en masse*, to determine positively; and I had about concluded that the difference might be due entirely to the polymorphous character or nature of the variety. Many other varieties show quite as wide a range in the form of their berries during the season. I would like to hear from others on the subject, if they have noticed this variation A cockscombed berry of Jessie or Sharpless, though frequent, can hardly be considered typical of the general character of the variety as to form, but the largest Pearl is a correct type of the smaller ones, and if we except the largest and often twin berries of the Crescent, the others are all of one general type.

The Bubach No. 5 is large enough to suit all reasonable demands in that line. The quality is hardly equal to the Pearl or Jessie, neither is it as firm in texture; in this respect it is much like Jewell and I think nearly as susceptable to blight. From the opening of the season up to the 12th the weather was clear and well adapted to give the berries firmness and quality. For the ensuing six days, showers were abundant, and the air during the entire period was very humid with no sunshine—excellent conditions to render the fruit soft and vitiate its flavor, which it did to perfection. During this time rot and rust appeared among the berries, and the Bubach suffered badly, showing a weakness in this respect I was sorry to see. Few varieties can pass such an ordeal unaffected. If this proves to be the weak point in this variety, as it looks now, its future success will depend largely on the condition of the weather ruling at the time of its ripening. I am not quite as hopeful of it as I was last year.

Do varieties run out? It seems only necessary to look at the present status of the varieties in popular favor ten or twelve years ago to answer that question. The cause or causes for this may be variable and in a measure preventable. It would not seem unreasonable to suppose that any variety renewed annually by young plants produced after the parent plants had exhausted themselves in producing a crop of fruit would in a few years become constitutionally enfeebled, far more so than if an opposite course were pursued; and yet if it were possible to procure a stock of Chas. Downing plants as vigorous and healthy as those I obtained when it first came out, I have no idea I could by any possible treatment succeed as well with it as I did then, because the fungi so prevalent now were then unknown, and as these parasitic diseases multiply it renders the success of all our varieties more and more precarious. By practicing extra care in regard to the hygienic condition of the plants, as President Smith, of Wisconsin, does with his Wilsons, any variety would doubtless hold its own much longer than if less caution was used. The intelligent fruit grower, to be successful, must keep pace with the advancing and multiplying forces of his enemies or he will get left, most assuredly.

E. WILLIAMS.

TESTED RUSSIAN APPLES.

THE CALL of Minnesota, in 1867–8, to the National Department of Agriculture, for an importation of apple trees from the country that had supplied the only good varieties (Oldenburgh and Tetofsky) which, up to that time, had been found able to resist the test winters of that region, was responded to with a surprising degree of completeness. Even to-day, with all the after-raking of the Budd-Gibb expedition, it would be difficult to find in many orchards any bearing apple trees of this race not included in that list. This is not said with any view of disparaging the labors of those gentlemen. Far from that; the critical study of Russian pomology made by them has brought order out of the chaos of the Department list, and has bestowed upon us all the iron-clad pears, plums and cherries required to complete our supply of tree fruits, and place northern orchardists on something like an equality with those of the rest of the country. In apples, the work, now proceeding under the hands of Professor Budd, in discriminating varieties and eliminating synonyms, and also in classifying the whole list according to the merits of each variety, as to quality and climatic adaptation, cannot be over-rated. Professor Budd, in the most laborious and careful way, is doing for the iron-clad fruits what the Downings did for the longer known varieties. No one has had more reasons for gratitude to him for this work than myself.

But as intimated above, the drag-net of the Departments' Russian correspondent operated very thoroughly. Just 250 named varieties are given in the original printed list, sent out with the cions. But these cions were distributed so miscellaneously and unintelligently that it is not very probable that more than one-half of the varieties are accessible, even if existent. Instead of being sent to nurserymen in the northern tier of states, or to leading orchardists in that section, they were sent in the same way as garden seeds. The larger quantity thus went outside the limit within which they might have proved specially valuable; and worse still, they went to hundreds of men in the section where they were needed, who had no stocks upon which to graft them, even if they knew how to graft. Even where they may have been used, and proved valuable to the user, they were generally hid in out-of-the-way places, and practically buried from the public. I cannot learn, after much inquiry, that a single variety from this distribution was ever propagated in Maine or New Hampshire; and I am one of but three persons in Vermont who are known to have received and propagated them. There must have been some careless labelling, for among the ten varieties sent to me, one which proved to be very closely related to Alexander, if not identical, had the label of "Riabinouka," which is described as a small apple by Dr. Regel, of St. Petersburgh.

As rapidly as I could, I acquired others in this list from my correspondents, east and west, as soon as fruited. In this way I got Grand Sultan from D. W. Adams, of Waukon, Iowa (now of Florida), and Charlottenthaler from Professor Budd, who was then a nurseryman at Shellsburgh, in the same state. I also got White Transparent and Sweet Pear from Aaron Webster, of Roxbury, Vt.; and another apple—the label lost—from Mr. Howard, of West Randolph, Vt. This last was very much like my "Riabinouka," of the Alexander type, yet not quite the same; and we now know, by way of Messrs. Budd and Gibb, that there are in Russia families of apples (probably seedlings from orchards of single varieties), which produce nearly identical fruit, yet on trees showing considerable differences. The Alexander type is known there as the Aports, while Grand Sultan, Charlottenthaler, Sweet Pear and White and Yellow Transparent are known as the Transparent family. The Longfield, Good Peasant and English Pippin, as we have them, constitute another family.

Though I was acquainted with the fact of this importation, and received a share in it among the first, twenty years ago, it may appear a singular fact that I have as yet planted and grown extensively but a single variety—the Yellow Transparent. The reason is that among the first sorts I got hold of, though most of them had merit, and all were iron-clad, this was the only one of much commercial value. St. Peters, a nice little early apple, which I nicknamed the "Russian Early Joe," is too small. Prolific Sweeting is a large and admirable fall sweet; but sweet fall apples are not in much demand. Golden White (apparently identical with the "White Russet" of the same list, though possibly only a member of the same family) was too near Oldenburgh in season, and less attractive—though better in quality, and a longer keeper. Green Crimean, Sugar Barbel, Spreading Pipka and Yellow Arcadian have little merit, aside from hardiness.

Of more recent requisitions, I find positive merit in such large, handsome and productive autumn kinds as Titus, Zolotoreff and Switzer, all closely succeeding Oldenburgh, which is my standard variety of that season. But I am not decided yet to select one of these, rather than the Red Beitigheimer, an apple introduced by Ellwanger & Barry as German, but which proves as iron-clad as the Russians. Antonouka and Longfield promise to be worth planting as profitable early winter varieties. The Red and Yellow Anises (much alike, both having considerable color), are too small for market. The same must be said of Borsdorf, a longer keeper of good quality. Getting beyond these, we need time in order to arrive at satisfactory conclusions.

Vermont. T. H. HOSKINS.

POMOLOGICAL ILLUSTRATIONS.

IT IS, perhaps, evident to nearly all those who peruse the horticultural reports, magazines and newspapers of the day, that the pictures of fruits found in them are far from representing them as they actually exist in nature. This is particularly true of many of the colored illustrations. There is no doubt that in some respects advancements have been made in the last twenty-five years in the way of horticultural illustrations, but I think it is equally true that there has been considerable degeneration in some particulars: take, for instance, the colored plates in the "Fruits of America," by C. M. Hovey, published in 1851, which, according to my judgment, exceed in careful and truthful delineation of the size and color of fruits mentioned those that are being made in later years.

It is not my purpose to merely find fault with the present state of things in this regard, but rather to assist in some measure in bringing about a change that shall work good to the cause of pomology, and if possible, to those who make the illustrations. The principal seems to me to lie,

First. In exaggeration as to size of fruits. This comes in a great measure from an over weening desire on the part of introducers and propagators of fruits to cause the public to believe that they are larger than is really the case. This is, in the end, very unwise, according to my view of the matter, as after the trees or plants have been purchased and fruit has been produced, in very many cases much smaller than shown by the flaming advertisements, the grower is disappointed and tempted to disbelieve anything of the kind that is represented to him in the future. If the exact size of a good average specimen had been given, all this would have been avoided, especially if the picture had been accompanied by a printed statement that good culture and climate were necessary to produce as good fruit as that shown.

Several of the largest colored plate manufacturers in this country have told me repeatedly that if they would make plates correct as to size and color, the nurserymen would not buy them, and that they demanded something attractive, even though it be untruthful, and that the nurserymen, moreover, demanded the plates at a price that is far below the cost of good work. These are serious charges, but that they are true, I am forced to believe. Certainly, the nurserymen are generally an upright set of men, but why should they have degenerated from the standard seems strange, except in the light of reduced profits in the business.

Second. Unnatural color. Nature paints with such exquisite taste and in such voluptuous colors that it is beyond the ability of men to exceed her in beauty. Why, then, should not the fruit-artist of to-day copy her as truthfully as possible, and not prostitute his art by making glaring daubs of contrasted colors that are not half so beautiful as the fruit he essays to paint? It is beyond the skill of the best artists to reproduce the delicate tints that the sun has painted with his incomparable brush. The truth is, the artist cannot do it *perfectly*, but I certainly believe it can be much more accurately done, and with but little more cost, than at present.

Third. Lack of detail and coarse execution. In this regard there is also great room for improvement. This is very noticeable in the representation of leaves, which should show the ribs and veins, both regular and irregular, as nature has made them. Photography has recently come to the aid of the wood-engraver and the lithographer, and in some respects has proven a very accurate and helpful servant, but I am sorry to say that many of the photogravures are but mere patches and blurs, especially those which represent branches with their leaves attached. The fact is, that it is impossible to focus the camera in such a way as to show the detail both near and in thedistance; hence it seems to me unwise to attempt to reproduce a negative which cannot, from the nature of the thing, be otherwise than partly out of focus.

In the matter of wood engraving, which at best is very costly when well made, we find very little to encourage us, and it seems to me that India ink drawings, which are made and reproduced by photoengravings, is not only the cheaper, but much more accurate method of reproduction. POMOLOGIST.

A WONDERLAND OF CACTUSES.

NOVELTIES, CURIOSITIES, BEAUTIES—EXPERIENCES OF A CACTUS FANCIER.

IT IS not saying too much to assert that cactuses are now about as popular as orchids; indeed, we do not hesitate to say that there are, in this country, more cultivators of the former than of the latter. The reasons therefor are many. In the first place, cactuses are cheaper; next, they are freer bloomers—their flowers are as brilliant, as large and in many cases as interesting. We doubt, in fact, if the true night-blooming cereus can be rivaled by any orchid. Again, their management is of the easiest; they do not require a carefully regulated temperature, nor close attention as to moisture and watering. One can safely take his summer vacation and leave the cactuses in the house or garden without fear of losing them; in fact, a good rest often helps them wonderfully, even in summer. A choice collection of the various cactuses when not in bloom is certainly much more interesting than orchids can ever be when not in flower.

Until recently florists have generally neglected cactuses, the main reasons being the slow growth of the scarcer varieties, the difficulty of obtaining them at any kind of reasonable price, and the limited demand. These objections have now been overcome, and as a result, almost all florists give them a prominent place in their greenhouses as well as in their catalogues.

The most popular kinds are not the large fine-blooming phyllocactuses that have little beauty of their own, but rather the curious, handsome-spined mamillarias, the large and brilliant flowering echinocactuses and echinocereuses, the gorgeous night-blooming cereuses, as well as the interesting oddities in anhaloniums, curious grafts, monstrosities, etc.

When showing any one our collection, the echinocactuses invariably receive a large share of admiration, especially when they are in bloom. The finest of all, without a single exception, is *Echinocactus Grusoni*, which was discovered a few years ago on an almost inaccessible Mexican mountain, and named in honor of Mr. Gruson, the celebrated manufacturer, of Magdeburg, Germany, who has the finest collection of cactuses in Europe. The plant is generally of globular shape, and the beauty consists in the bright golden color of the almost transparent spines, which cover it so closely as to give the plant the appearance of a ball of gold. Specimens a few inches high, as well as those measuring a foot or more, are equally beautiful. A strange peculiarity about this cactus is that never a bug or scale has been seen on it.

Totally distinct from the foregoing is *Echinocactus ornatus*. In this species the spines and ribs are few in number, the color of the plant is grayish-green, and it is entirely covered with *pure white raised spots*. The contrast between it and *E. Grusoni* must be seen to be appreciated.

Third on the list we would place *Echinocactus helophorus*, fine specimens of which are exceedingly scarce and valuable. It attracts attention from the fact that the body of the plant is deep green in color, and that it is curiously marked with dark red bands. This is the only variegated echinocactus known.

It is a curious fact that nearly all the fine-spined echinocactuses are inferior in bloom to those with less brilliant "plumage." *E. Texensis*, *E. bicolor*, *E. lophothele*, for instance, are not handsome plants, but their flowers are large and brilliant. The same might be said of *E. capricornis*, which is more curious than attractive, but has the merit of producing for months in succession, flowers five to six inches long, of the most intense golden yellow with bright vermilion center.

The echinocereuses are not so brilliant in their spines, with the exception of *Echinocereus pectinatus*, var. *candicans*, recently christened "Rainbow Cactus," probably because the rings of bright red, pink and white spines encircle the plant in curious symmetry. This is undoubtedly one of the most profuse bloomers among cactuses. We have just taken a photograph of a plant five inches high showing thirteen well developed buds. When fully expanded, the flowers measure four to six inches across, and when in bloom the plants are dazzling. The flowers are edged with a deep border of brilliant magenta; the center is pure white, the stamens orange and the pistil bright green. This plant is also of the easiest possible management, delighting, however, in the fullest sun and sandy soil. If planted in red gravel the spines will become almost blood red. Our experience this year with some thousands of plants has decided us to place it at the head of all echinocereuses. In Europe, where it is still new, it is called *Le Roi des Echinocereus*, "the king of the echinocereuses."

Echinocereus pectinatus itself must now take second place on the list, and yet it has advantages not possessed by var. *candicans*, in that it forms large clusters of heads, each of which bears several flowers that are very fragrant. On single plants, the flowers will often measure five inches in diameter. This species is becoming less plentiful in its native home; collected specimens are small and seldom perfect in shape, while three or four years ago magnificent clusters, measuring two feet across, composed of many heads three and four inches in diameter, could be obtained without difficulty.

Echinocereus dasyacanthus should be grown as a contrast to the two preceding sorts, on account of its very large yellow flowers, four to five inches in size. *Echinocereus chloranthus* is grown for the beauty of its spines, which are red and white. The flowers are not very attractive. Among the fine bloomers we might mention *E. Fendleri*, purplish-crimson, large; *E. phœniceus*, which forms large clusters of heads and crimson flowers; *E. gonacanthus*, of which the flowers are entirely distinct from those of other echinocereuses, being what we would call a vermilion-scarlet, very waxy in texture and remaining open for a week or more; *E. cæspitosus*, also bearing fine flowers, but the plant does not remain in good condition, being generally rusty towards the roots. Several of the echinocereuses are very interesting when grafted on stout cereuses.

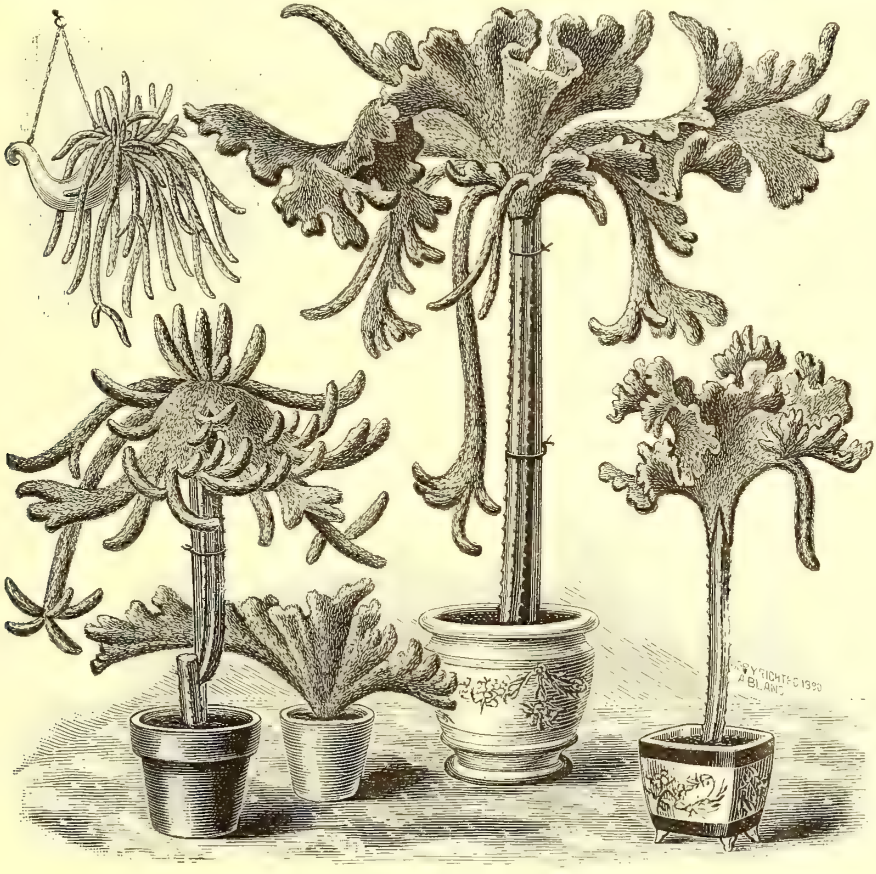


FIG. 1. MONSTROSITIES OF CEREUS FLAGELLIFORMIS (GRAFTED).

Cereus grandiflorus, the night-blooming cereus, is perhaps the best known of all the cactuses. Its rapid growth, ease of management and the enormous night opening flowers have made it popular. It is not generally known, however, that under the name of *Cereus grandiflorus* many sorts have been put in commerce. They all bear large flowers which open at night, and which, to most people, appear to be alike. The *true Cereus grandiflorus* is the only one that has decidedly fragrant flowers. Its stem is fully set with spines, and its growth is not rapid. *Cereus MacDonaldiæ* bears flowers nearly as large, but they are not fragrant. It is a very quick grower and a much freer bloomer than the other. The stems are slender, cylindrical, and at regular intervals are set with fleshy tubercles instead of spines. *Cereus nyctacalus* we consider the most desirable of the night blooming-cereuses on account of its very rapid, strong growth, which often enables an amateur to have a blooming plant the second year from a cutting It is also a very profuse bloomer if fully exposed to the sun in winter. The stems, which are four to five-angled, become much stouter than in *C. grandiflorus* or *C. MacDonaldiæ*. We use this extensively for grafting other varieties on, especially for *Cereus flagelliformis*, or rat-tail cactus, which is wonderfully improved by grafting. It then grows stronger, quicker, blooms more profusely, and never rots off, which it does so often when grown on its own roots.

We now graft it in a different way than formerly, viz: split the graft and cut the scion to a wedge, sticking a cactus spine through it to keep the graft from slipping, and tying it on tightly with string or twine. The union is effected in two or three days. Care must be taken that the plant is well watered after grafting, so that growth is not checked. Do not let the graft get wet until after it commences to grow. Our greatest amusement has been to graft *Cereus flagelliformis*, var. *cristatus.* This is a malformation—a freak of nature—and is still exceedingly rare in collections. We have perhaps a hundred grafts of it, and the curious part is that no two plants are alike. They all assume distinct forms and change their shape continually, so that after one month's growth a plant would not be recognized. Fig. 1 was made from grafts one and two years old in our possession, and gives an idea of some of the forms. With careful selection many oddities can be produced. The plant has a tendency to send out one or more long rat-tail-like shoots; these, if taken off and grafted will continue to grow sometimes to a length of one or two feet, and then all at once they will begin to spread out in fan-shaped forms. This monstrous form is not commonly floriferous, but when it does bloom the flowers are usually of cockscomb shape.

In grafting this or the regular *Cereus flagelliformis*, it is not necessary to take a large scion; a piece one or two inches in length will be enough, but the stronger the stock on which it is grafted, the stronger the graft will grow. A very small piece grafted on a large plant of *Cereus nycticalus* on January 1 now measures nearly three feet in circumference. On this same plant we have grafted various other sorts, such as *Cereus coccineus*, *C. speciosissimus* and epiphyllum, which are all making growth and will no doubt bloom in due season. One of our main reasons for grafting on the various night-blooming cereuses is that it does not prevent the stock from blooming. The stock of which we have been speaking bears now over 25 buds.

The cereus tribe is perhaps more diverse in form than any other. From the creeping rat-tail cactus to the giant cactus of Arizona *(Cereus giganteus)*, measuring 50 to 60 feet in height, is certainly a great step. What a pity that the flowers are not in proportion to the size of the plants! The accompanying engraving, Fig. 2, represents a plant of *Cereus giganteus*, of which the main stem has assumed a cristate or fasciated form. The normal condition of the plant is shown by the side branches. We had a curious experience trying to secure one of these fasciated giants which our collector discovered in the southwest. It was impossible to transport the whole plant, owing to its bulk and enormous root; so we organized a force of hands, with teams, derrick and paraphernalia, to secure the top. After many miles of traveling and tiresome climbing, our collectors arrived on the spot, when lo! they were too late! Someone else had taken possession of the plant, and left them in the lurch. A woodpecker had actually hollowed out the head and built himself a home in it, not knowing what a valuable prize he had utterly ruined; for the head had decayed, until nothing but a mere shell remained of it. We were fortunate, however, to secure the flattened head of another giant, who probably was "monarch of all he surveyed," for he carried his head forty feet high. It is now in the company of our "old man" cactus, where it attracts much attention. This is undoubtedly the only living severed head of a giant in the world, and already many foreign cactus collectors are clamoring for a slice of it.

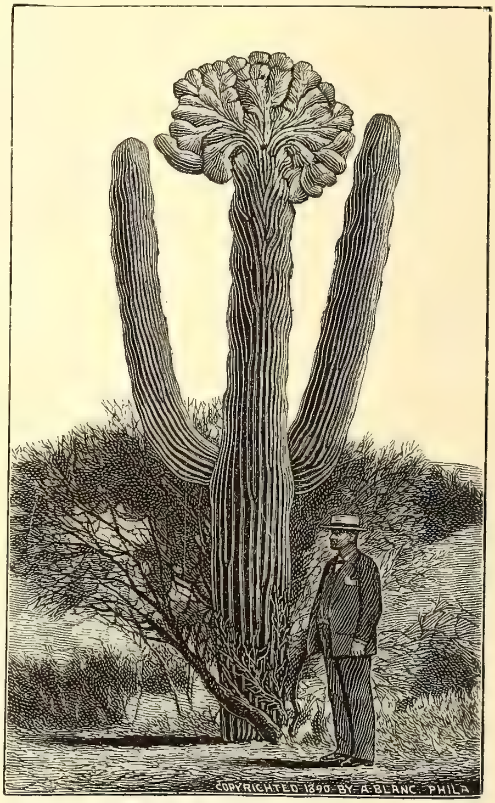

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FIG. 2. FASCIATED CENTRAL STEM OF CEREUS GIGANTEUS.

These giants, by the way, are wonderfully tenacious to of life. We have some plants six, seven and eight feet high, three feet or more in circumference, which were lost on their way from our ranch in New Mexico for a period of nearly nine months. When at last they were found and sent home, they presented a skeleton-like appearance. We cut the dry roots off, planted in tubs, and in less than three months they were growing and blooming. The giants are beautiful specimens for the lawn, but their weight make them difficult to handle. Many plants shipped by us to Florida have proved perfectly hardy; indeed, we are informed that in their native home they grow at an elevation where the thermometer reaches ten degrees above zero.

The finest flowers that we have ever seen opened with us last week on a cereus recently received from South America. The plant is new to us, is of very stout, upright growth, with four much compressed angles. It is a night-bloomer, and the flowers, which are entirely distinct from any cereus that we have ever seen, are composed of six rows of petals, numbering in all nearly 140. These are beautifully recurved, the innumerable stamens projecting well above them. The entire flower measured 30 inches in circumference, and, most interesting of all, they were of a *deep satiny pink*, a color heretofore unknown among cereuses. The fragrance equals that of the night-blooming cereus in strength and sweetness.

A cereus that always attracts attention is *C. Jamacaru*, var. *glaucus*, of which the young growth is of a delicate *pale blue*. This color is retained only for a year or two, when it becomes dark green. The young growth, therefore, contrasts beautifully with the older stems. How provoking it is to see visitors touch these plants with their hands to see "if they are not painted," and leave their indelible mark on them! The red-flowering cereuses, such as *C. speciosissimus*, *C. coccineus*, etc., bear very brilliant flowers. The most distinct bloomer is certainly *Cereus Baumanni*. With us it blooms winter and summer. A plant cut off at two feet from the base has borne more than fifty flowers since Christmas, and is still showing buds. The flowers are only about 2½ inches long, tubular, slightly recurved, bright vermilion and orange yellow. This cereus must be kept growing winter and summer; if allowed to become too dry the top will shrivel up.

From true cereuses we naturally drift to the section pilocereus, especially to *P. senilis*, old man cactus, which is covered with long, white, silky hairs, that make it so attractive to any who sees it. We well remember how careful we were of our first two specimens obtained from Mexico, by way of Europe (!), at the cost of a good round sum True, they were but a few inches high, but just as handsome as the old fellows three or four feet tall. We are not afraid, now, to wash with soap and water when their hair becomes dusty. Experience has taught us that if planted in very sandy sail, the old man likes plenty of water at the roots and over his hairy coat.

All the pilocereuses, it must be remembered, are not hairy; indeed, some have formidable spines, but they are all valuable and considered beautiful plants. *P. Dautwitzi* is entirely covered with very fine white hair, curled all over the stem, and is usually valued at one dollar per inch. We doubt if ten plants of it exist in the New World. *P. Houlletti* is also very remarkable from the fact that it has tufts of white hairs projecting between the spines, usually *pointing to the north only*, probably as a protection from cold winds. This plant, however, is so liable to rot that its cultivation should not be encouraged.

The mamillarias, while mostly small as compared with cereuses and echinocactuses, are just as interesting. Here again we find that, as a rule, the handsome spined varieties have the least attractive flowers, and *vice versa*. For those with limited means and space, mamillarias will prove very attractive. Look at the little *M. micromeris*, one-half inch in diameter, with a tiny rosy flower nearly as large (or as small!) as the delicate button-like plant! And what a tough little chap it is! Here are a couple of stray little fellows that have been lying on our desk for six or seven weeks, after traveling thousands of miles. We brought them home in our vest pocket. They are harmless—no spines to prick your fingers. Just put them in a small pot of moist sand and see if, in a few days, a bright coral seed pod will not appear, and after that, little satin-like pink flowers! With an intelligent selection, a fine show can be made with mamillarias alone, as the colors of the spines vary through white, gray, pink, purplish, yellow and brown-black. Those not closely set with spines show the green body of the plant, and are indispensable for contrast.

All the foregoing species of cactuses may be grown with success in any kind of very sandy soil, in well-drained pots just large enough to hold the plants. Large pots and soggy soil will surely kill any cactus. Water moderately from March until October. Some of the cereuses, however, will take a richer soil, and may be repotted when the pots are full of roots if good growth is required. *Cereus grandiflorus* will bloom much better and sooner if allowed to become pot-bound, but it should then be liberally watered when growing, using liquid manure when in bud.

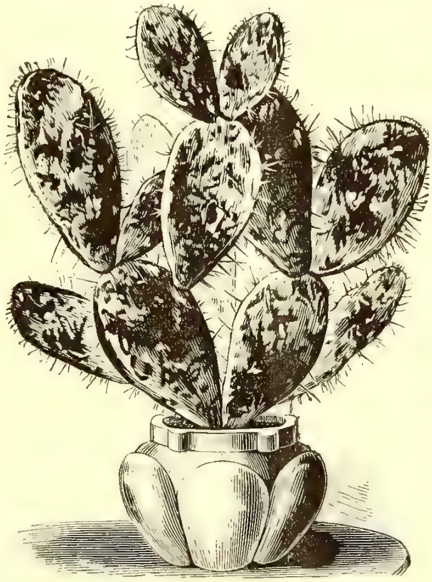


FIG. 3. OPUNTIA MONACANTHA, VAR. VARIEGATA.

Some people have "luck" with the leaf cactus, or phyllocactus; others have not. Look at the one on the farmer's porch, in an old milk can; the water from the roof is nearly drowning it, yet it has over twenty buds! But here is Mr. Orchid, who has a fine greenhouse in the city and follows instructions closely, and he has to wait five years for a flower! We have seen phyllocactuses full of bloom when three years old. Three inches deep of sheep manure was placed in the bottom of the pot, but next year the plants were dead.

A phyllocactus should bloom when two or three years old; many of them bloom the first year from cutting, depending on the care which the plant has had. In order to induce blooming, the plants must not be kept too hot in winter, and yet be fully exposed to the sun without changing their position. The well-ripened wood is that which blooms. The cellar is a poor place for them. The idea that a cactus must be seven years old before it blooms is nonsensical.

Phyllocactus latifrons (broad-leaved cactus) "the night-blooming cactus," often erroneously called night-blooming cereus, will, if well grown the first season, bloom the second year. It is undoubtedly one of the very freest blooming cactuses known, if not the very best, and perhaps the easiest plant to manage, as it grows in almost any soil, does not require a greenhouse, and will give more flowers in a season than any other cactus we know. It should never be grown in full sunlight. To any one who wishes to grow only one cactus, we would recommend it. Most of the other phyllocactuses are very desirable as show plants when in bloom, and will reward the grower with a more or less number of flowers every season. A friend sends us a photograph of one that is 40 years old and bears hundreds of flowers every season.

The pink-flowering ones are free bloomers, but the white and yellow ones are rather shy. I have grown nearly 100 different named varieties of phyllocactuses, but think that they might be cut down to 30 sorts, as many are so near alike.

The few anhaloniums should receive a line or two, as they are so curious and easy to manage. *A. prismaticum*, which we grow in red gravel, never fails us, although in Europe it is impossible to keep it. *A. fissuratum*, which we may perhaps be pardoned for christening "The Living Rock," is a great curiosity indeed, unfortunately becoming scarce, as we are informed that they only grow on a very limited area and have there entirely disappeared. A new form of this species has been discovered this year. It is remarkably beautiful and scarce, and has not yet been named. *A. Williamsi* is also a curious sort, entirely distinct from either of the above.

Another curious and exceedingly rare cactus is *Pelecyphora aselliformis*, called the "Hatchet cactus," probably for the reason that the tubercles, when detached from the plant, resemble the head of a hatchet. It is very peculiar. The plant generally looks like a piece of carved wood.

A very handsome opuntia is *O. monacantha*, var. *variegata*, the joints of which, as shown in Fig. 3, are mottled, splashed and streaked with white, gray and green. When growing, it is particularly remarkable, as the young branches are of a very bright pink and contrast agreeably with the rest of the plant. It is scarce. Another very fine opuntia is *O. Emoryi*. Its pure white, broad, flat spines, covering the plant closely, usually attract attention among the duller colors of other opuntias. Large clumps of it, when covered with their large yellow flowers, are particularly fine. (Fig. 4.)

Opuntia microdasys is already well known. Its minute tufts of yellow velvet-like spines, which prove so deceiving to the touch, give it a unique appearance. We have been struck with its remarkable free-blooming qualities. Last year we cut off some large single joints, put them in boxes of sand to root, and they almost immediately began to bloom, some joints having as many as nine flowers. This year, after taking off the young joints for propagating, the old ones again began to bloom immediately, excepting, however, those that had not been fully exposed to the sun all winter.

Fig. 5 (page 533) shows a curious collection of fasciated and flattened cactuses of various species. It is a striking illustration of the variation of these singular plants under culture.

Philadelphia. A. BLANC.

THE PROPAGATION OF CACTUSES.

FEW plants are more easily propagated than cactuses. Although they are in some ways slow growers, the process of reproduction in large quantities is not at all difficult.

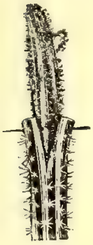
Probably the least used method of increase is by seeds. If the seeds are fresh they will come on easily, and in all cases which have come within my observation, within a comparatively reasonable time. Sow in sandy soil, the sand being rather coarse, and give as much water both before and after germination as would be given any ordinary seeds. They should by no means be kept dry. They should be pricked off in pots or pans, when large enough to handle, still using a coarse sandy soil with plenty of drainage, and a quick growth encouraged in every way. This growth is good in most cases if a fairly warm temperature is maintained and too much dryness is avoided while the plants are growing. February is a good time to sow, and they can be kept growing for nearly twelve months.

In propagating by cuttings, some kinds of cacti present difficulties in obtaining the cuttings; otherwise this method is simple and probably the easiest of all, particularly where the conveniences are limited. All that is required when cuttings can be obtained is a well drained propagating bed with two or three inches of good sharp sand, and the bed may be large or small, depending on the number of plants required. Our practice is to gather the cuttings a week or two before the new growth begins, any time from February to July or

August, and, unless the plants have been kept rather dry, instead of planting immediately we lay them on dry sand for several days, then plant like ordinary cuttings, but in dry sand, and withhold the usual watering. Plant firmly, and give some shade at first. If there is any sign of flagging give a little water, but sparingly until the callus is made and roots begin to form. After this the treatment is easy, not differing from other plants except in using well drained and sandy soil. I find finely broken potsherds an excellent addition to the soil for the young plants.

Some kinds root much more quickly and easily than others; for instance, with epiphyllum there is no need to keep dry. Plant and treat as you would coleus cuttings.

Some cacti are best propagated by grafting, for the reason that we get a better development of the plant, and that the plant so obtained is better fitted to withstand sudden changes in temperature and in the water supply. Good examples are such sorts as *Epiphyllum truncatum* and its different varieties, and any of the slender growing kinds like *Cereus flagelliformis*. *Pereskia aculeata* is an excellent stock, or a showy and upright growing plant like *Cereus triangularis* can be used. It is not always necessary to root the stock first. The grafting and the rooting of the cuttings can be done at the same time, even using cuttings ten inches or more in length. My usual method, however, is to grow on a lot of *P. aculeata* in four-inch pots, the cuttings being put in during January and pots plunged out in summer. If staked and pruned while growing, plants from one to two feet are obtained ready for grafting the following winter. Store in some convenient place until February; then they are to be cut back to the required length, and the graft inserted. This can be done in almost any of the different ways of grafting, as a wedge graft on the top and a couple of side-grafts The veneer side-graft described by Mr. Crandall in The American Garden for February last (p. 64) is excellent. If good growth is maintained during the summer, plants will bloom finely the following winter. The points to observe in grafting are these: Do not cut the scion too thin; the least possible removal of the epidermis is enough. Do not wound the scion by the tying. We use a cactus thorn, as in the accompanying cut, to secure the graft in place, and then give a firm but not tight tie with broad moist strips of raffia. No wax is needed nor is confined air necessary. The grafted plant is laid on its side, on the bench of a warm house, and a little loose sphagnum is thrown over the grafted parts for a few days. Union takes place within a few weeks, and nothing remains but to encourage a good growth. Fine heads can be obtained in the course of the summer. Care should be taken to keep down the natural growth of the stock.



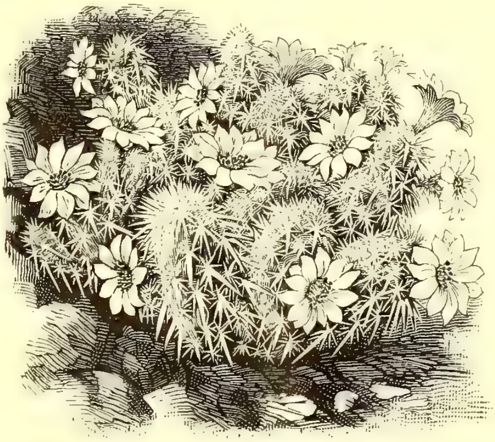


Fig. 4. Opuntia Emoryi.

Pereskia aculeata can be grown as a rafter plant and grafted when the top of the house is reached. Here we put in side-grafts about eight inches apart the whole length and these can be thinned out wherever the growth is too thick. And care must be taken to support the growing epiphyllum, or the branches will drop off from their own weight. *Pereskia Bleo* (Fig. J, August Garden) is also a good stock, but is less used than *P. aculeata*. It is more valuable as an ornamental plant, however, having rose-colored flowers.

Bussey Institution. B. M. Watson, Jr.

NATIVE FLORIDA CACTUSES.

THE NATIVE and naturalized species of cactuses growing on Florida soil are nine in number—five species of opuntia, four of cereus; no other genera are represented. It is quite possible that the average winter visitor to Florida does not know of the existence of one of these species; if familiar with any, it is quite likely to be the much abused *Opuntia vulgaris*. This is the only species found away from the coast, and being almost non-inflammable, it is often seen growing in the high pine woods of the interior, where the ground is burned over every year, and this opuntia appears as a most prominent feature of the landscape. The large showy yellow flowers, which are followed by small, edible, purple fruits, make it a most desirable plant; it is one of those cases where familiarity breeds contempt, even for beauty.

Along the north-eastern coast, and on the islands at the mouth of the St. Johns river, the little *Opuntia Pes-Corvi* is found, perhaps also in some other portions of the state, but it is not very widely distributed.

Next, and of more importance, is *Opuntia Tuna*. This famous species, so well-known as a hedge-plant in Mexico and the West Indies, seems to have entirely escaped the inquisitive eyes of the many *savants* who have botanized on the coasts of Florida, though it abounds on every high sandy beach from Tampa Bay around to Miami, and perhaps still further north on the east coast. We can scarcely believe that any one who has ever botanized on the coast of South Florida, has kept his "shins" from coming into occasional unpleasant contact with it. It quite often grows in impenetrable masses four or five feet high, and is characterized by large oval joints, six or eight inches long. It is covered with two sets of spines—some small and chaff-like, but whose close acquaintance is not to be courted, and others an inch or more long, as sharp and strong as needles, and quite as formidable as any cactus we have ever seen. The yellow flowers almost invariably have a rosy tinge, and the plant is beautiful, both when in bloom and when covered with the large rich purple berries, or "prickly-pears."

Besides its use in Tropical America as a hedge-plant, it is used as one of the principal cochineal plants. By the by, what is to hinder the establishment of this industry on the acres of *Optunia Tuna* along on the South Florida coast? Probably the falling off of the use of cochineal, as the world runs after the gayer anilines, is the practical bar to producing the dye in Florida.

This species, too, is quite hardy, and will stand several degrees of frost unharmed. The fruits, covered with occasional tufts of small chaff-like prickles, are two or three inches long, somewhat pear-shaped and pumpkin-colored. They are produced in the greatest profusion, and are quite likely to become valuable, in time, for culinary purposes, though but few people are acquainted with their uses.

We know of a certain lady who has been experimenting, and of a certain cupboard containing an array of glasses of marmalade, and jars of the richest wine-colored sweet-pickles, all made from the fruit of *Opuntia Tuna*, and as tempting as an epicure could wish. Certain it is that more attention to edible and "cookable" cactuses, and commercial use for the fruits, are in the strong probabilities of the near future.

Equally as famous as *Opuntia Tuna* is *Opuntia Ficus-Indica*, the "Indian fig" cactus. This species has escaped from cultivation and has become naturalized in a few places in South Florida, especially on Key West. It also, like most of the optunias, is very hardy, and would probably prove so in North Florida. It is a most striking and picturesque plant, attaining, in a few years from the cutting, a height of ten or twelve feet, with immense flat joints a foot or even fourteen inches in length. The scale-like spines often drop off and leave the surface perfectly smooth, so it is not very prickly, nor difficult to handle., The fruits are larger than those of *Opuntia Tuna*, and are yellow in color. The pulp is sweet and has very few seeds. It is very much liked by most people who are familiar with it, and we have seen those who preferred it to such popular and delicious fruits as the orange and banana. The fruits are known as "Indian figs" in the West Indies, and stray specimens occasionally find their way into the New York markets from some West Indian schooner or other vessel. The plant will, in time, probably be quite extensively cultivated in Florida.

Opuntia polyantha, mentioned in Dr. Chapman's "Flora of the Southern States" as native on Key West, is also sparingly found on Upper Metacombe key. It is an upright growing species with thin oval joints and small prickles. It reaches a height of four or five feet, and is distinct.

A species of cereus found quite commonly on the Southern and Western keys as far up as Tampa Bay has also escaped the notice of most of the eagle-eyed scientists who have heretofore frequented the Florida keys on botanizing excursions. It is upright, or partly of scrambling growth, depending somewhat on bushes or trees for support. The stems are from one to two-and-a-half inches in diameter, and often ten feet or even fifteen in length, with very few branches, or none at all. The large white or straw-colored flowers are five or six inches in diameter when open; it is night blooming, and flowers when quite small. Mr. A. Blanc writes us that it is *Cereus serpentinus*, but Professor Sereno Watson is still in doubt as to whether it is or not. We have not seen the ordinary form of *C. serpentinns* in bloom, but to us, the *plant* at least seems different from this. Mrs. Nickels, of Laredo, Texas, who is familiar with *C. serpentinus*, pronounces this a different sort. Whether it is a different species, or only a variety of *C. serpentinus*, will probably be determined when the specimens at Harvard bloom. The fruit is spherical, two or three inches in diameter, and of a bright orange color. It is eaten by some people, but is really little more than a mass of small black seeds.

The fruit of *Cereus triangularis*, known sometimes as the "strawberry pear" is often used in the West Indies as a culinary vegetable. It is known as *God-ochro* in Jamacia, where it is quite an important ingredient of certain soups and stews, as it was formerly in the historical "pepper-pot." It is often set out in South Florida, and previous to the freeze of January, 1886, there were many immense specimens, even in the dooryards of Manatee, and it was found in Hillsborough and Orange counties. In Key West it is quite plentiful, and here Dr. Chapman considers it naturalized. It is one of the few plants brought to South Florida by Dr. Henry Perrine from Campeche, over fifty years ago, which has survived the ordeals of Indian wars, fire, water, wind and weather. One of the original plants was planted in Key West, and one sent to a florist in New Orleans. Almost the only other surviving plants of Dr. Perrine's introduction are *Aloe vulgaris*, still growing on Indian key, *Agave rigida* var. *Sisalana*, perfectly naturalized on the Southern and Western keys, and two immense date palm trees on the lower Metacombe. *Cereus triangularis* is night-blooming, with very large handsome white flowers. The triangular stems are one or two inches in diameter and delight in climbing on walls and fences.

Another species, which, like *Opuntia polyantha*, is peculiar to Key West and Lower Metacombe, is *Cereus monoclonos*. This species has an arborescent stem attaining a height of twenty feet--almost a miniature *Cereus giganteus*—a "baby-giant." A full-grown branched specimen is perhaps the most conspicuous and "unique" of all the Florida cactuses. The flowers are freely produced, but are small compared to those of many species of cereus. The diameter of the stem ranges from two to eight inches.

The most plentiful, and at the same time the most "murderous" species of cereus found in Florida is *Cereus variabilis*. This is only found below the Caloosahatchie river, but it is there found on all the high land in sufficient quantities to "strike terror into the heart" of the adventurous "Conch" (Bahamian) who essays to start a tomato patch or a pine-apple farm. The stems are about the size of those of *C. triangularis*, and are three, four, five, or six-sided, a peculiarity indicated by the name. They are of upright, scrambling, creeping, or any other style of growth; and are armed with most formidable spines an inch or more long, and so strong as to penetrate thick leather. It is one of the most formidable obstacles to clearing new land, and is only conquered by the *machete*, and a good hot fire. A thicket of this cactus, supplemented by quantities of *Opuntia Tuna*, the serrulate leaves of *Agave rigida*, the spines of its variety sisalana, with a "fair sprinkling" of "Spanish Bayonets" (*Yucca aloifolia*), and a half-bushel of brindle mosquitoes turned loose in their midst, constitutes a most effective protection to the early water-melon patches of far South Florida. The vigorous activity of the "skeeters" is well supplemented by the passive "cussedness" of this mass of various spines, thorns and prickles; and even the most hardened African lover of the juicy cucurbit may well pause in fear of the surroundings, if not in admiration of the nerve which could evolve a melon field out of this truly American jungle.

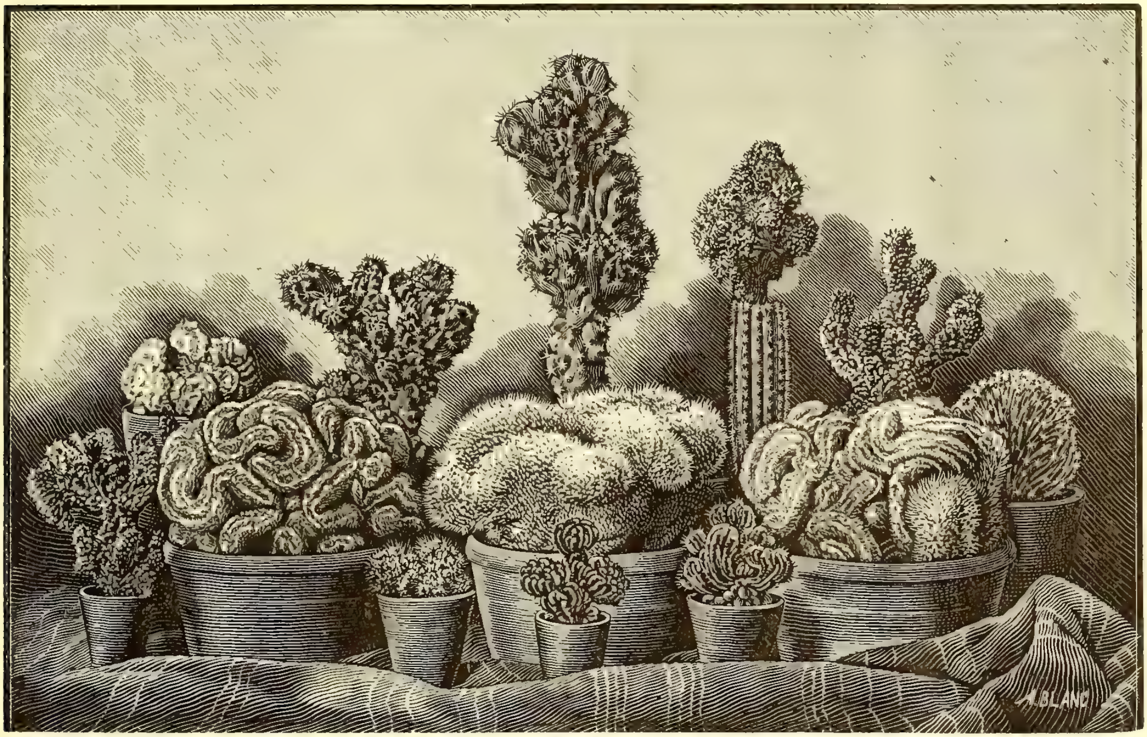


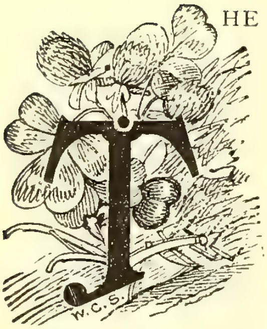
FIG. 5. A MEDLEY OF CACTUS MONSTROSITIES. (See page 530).

It is in cactuses, as in other things that grow, Florida demonstrates its wonderful adaptability and wide range. With the treasures of the tropics and the sturdy fruits of the north within our reach, ought we not be proud of our "land of flowers?" If only the occasional hard freeze was not the serpent in our Eden, how happy we would be!

Florida. P. W. REASONER.

EPIPHYLLUMS.

PLANTS WHICH SHOULD BE IN EVERY CONSERVATORY.



THE epiphyllums occupy an important place among stove or greenhouse plants, and it would be well-nigh impossible to find a more beautiful object than a full-grown specimen of *E. truncatum* when covered with its charming pendent blossoms, or one that better deserves the attention which has been lavished upon it and its kindred. There are other more curious and perhaps more interesting forms of cacti, but they are deficient in that combination of beauty and utility which is characteristic of the epiphyllum. Few general collections of exotics would be considered complete without one or more representatives of this elegant genus, and not infrequently one meets with creditable specimens in the hands of thrifty window-gardeners. The plants entail only a small amount of care.

The genus is not an extensive one, mention being made of but three species, viz., *E. truncatum*, *E. Russellianum* and *E. Altensteini*. They are all natives of the locality of the Organ mountains, in Brazil, where they grow parasitically on the trees in the extensive forests of that region. *E. truncatum*, the type species, is a handsome plant, with green pendulous stems which attain a length of several feet and branch freely. The branches consist of truncate-jointed sections which are compressed, distinctly toothed along the edges, and about two inches long by one inch across. The rich crimson flowers (paler internally) are about three inches long, and have the segments reflexed. (See Fig. 1.) It may be had in bloom any time between the early part of February and the latter end of April. *E. Russellianum* differs from *E. truncatum* in having more slender branches and larger flowers of a lighter shade, the segments of which point forward instead of backward. It flowers in May and June. Recent writers agree in saying that *E. Altensteini* is merely a variety of *E. truncatum*, but Mons. Labouret (an important authority on cactaceous plants, and one whose evidence should not be lightly thrown aside) considers it quite distinct, and is of the opinion that several of the other alleged varieties would also prove, after careful comparison, to be entitled to similar distinction.* The flowers of *E. Altensteini* are of the same form as *E truncatum*, but they are produced several weeks earlier, and the segments are of a pale pink color, tipped with purple. The stems, also, are longer and more slender than those of *E. truncatum*.

There is a large number of minor kinds, hybrids or varieties. Many of these are exceedingly beautiful plants, and the best of them are included in the following selection: amabile, an elegant variety, the white flowers of which are faintly tinged with crimson; aurantiacum, large flowers of a brilliant reddish-orange color; bicolor, white and purple; Bridgesi, a fine new sort which produces its rich purple flowers with great freedom; coccineum, bright scarlet; elegans, red and purple, a superb flower; Gærtneri, a magnificent hybrid, the origin of which is unknown (it is doubtless the result of a cross between an epiphyllum and a phyllocactus of some kind, for while it has the stems of the former, the bright scarlet flowers are similar to those of a small-flowered forms of the latter); Guedneyi. another new plant with lovely pure white and deliciously fragrant flowers; magnificum, large white flowers with rose-margined segments; purpureum, dark purple; roseum, charming rose, with streaks of deeper red; Ruckerianum, reddish purple and violet; salmoneum, reddish-salmon, tinged purple; spectabile, white, purple margined; tricolor, reddish-purple and white, and violaceum, pure white, edged with purple.

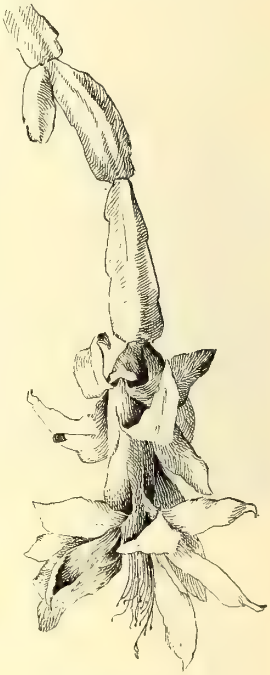


FIG. 1. EPIPHYLLUM TRUNCATUM.

Any of these may be grown successfully as window plants, provided the window is fully exposed to the sun. The room, however, in which such plants are grown must be kept tolerably warm in winter, that is, at a minimum temperature of about forty five degrees Fahrenheit. They will, of course, live in a lower temperature, but satisfactory results are seldom, if ever, obtained where it falls below the given limit. A greenhouse in which the plants may be subjected to a high or low temperature and a moist or dry atmosphere, according to their requirements at the various stages of growth, affords the most favorable conditions for the development of perfect specimens. The growing season succeeds immediately that of flowering, and so it follows that, if the plants require potting and trimming, those operations must receive attention as soon as possible after the flowers are shed. Peat, sand, leaf-mould, and rich loam, in equal parts, form a desirable compost for potting. A position near the glass in a house where a temperature of about seventy degrees and a humid atmosphere can be maintained will now be best for the plants. Use the syringe freely after bright days, and when the plants get started, keep the roots moist until the growth has attained completion. This usually occurs about the middle of July, after which a lower temperature, dry atmosphere, full exposure to sunshine with free circulation of air, and a somewhat drier state at the roots, will promote that maturity of the new material which is so essential to the production of a good display of flowers. In fall, say about October, it will be necessary to return the plants to a growing temperature and atmosphere, in order to develop the flowers, and it will be found advantageous to curtail the moisture again, when the buds are fully formed.

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*Monographie des Cacties, Paris, 1858.

The epiphyllums grow well on their own roots, but they are only suited for cultivation in small pots to be used as an edging in arrangements of larger plants, or for baskets, when so treated. The drooping character of the branches renders them very desirable plants for hanging baskets. The cuttings (consisting of pieces from four to six inches in length, of the branches) strike root freely at any season of the year if they are inserted in sandy soil, placed in a warm house and kept moderately dry. When they are rooted and show signs of commencing growth, they may be potted in the compost already advised. Plants intended for baskets should be allowed to reach a fair size in pots previous to being transferred to the former, and if they are afterwards submitted to the conditions essential to growth, their progress will be all the more satisfactory to the cultivator.

More stately specimens are obtained by grafting on stocks of *Cereus speciosissimus*, *C. colubrinis*, *Pereskia Bleo*, or *P. aculeata*. The last named plant undoubtedly forms the most serviceable stock. In addition to the ordinary methods of forming standards and pyramids, some growers train the stock to a rafter, and having reached the desired height, it is then pruned and induced to break simultaneously at a series of points along its entire length. Scions are inserted in the branches thus obtained, and in a remarkably short time the rafter supports an extensive mass of epiphyllums, which, in such a position, yield flowers in unusual abundance.

Seeds are employed for propagation only when it is desirable to obtain new hybrids or varieties.

C. McMullan.

CACTUS GROWING IN FLORIDA.

OWING to our comparative exemption from severe frosts, cactuses are much more easily grown here than at the north. Yet many of the choicest varieties must have protection from sun and rain in summer and frost in winter. A notable exception to the first part is *Pereskia aculeata*. Most people who are familiar with the odd forms and leafless stems of the cactuses common in cultivation would fail to recognize this plant as a member of the family. It is a strong, vigorous grower, of climbing habit; but the most marked peculiarity is the fact that it is abundantly supplied with true leaves. Owing to the size, shape and general resemblance of these leaves, the plant has received the name of "Lemon vine" in South Florida, where it is quite common.

It blooms profusely, the flowers being borne in dense clusters on the ends of short branchlets, which start from the axil of each leaf along the stems. In appearance they closely resemble small single roses, except that they are cup-shaped, not opening out flat, as is usual with single roses. The color is white, not the dead white of snow, but a clear, waxen, almost translucent white. Like a large part of the cactus family, the blossoms of the pereskia are very fugacious, opening in the morning and closing before night. They have but little fragrance —that of a single blossom would hardly be noticeable; but when a large plant is in full bloom there is diffused through the air a mild but pleasant perfume. In a frostless climate this would be one of the most satisfactory climbers that could be grown. It is evergreen, a strong, vigorous grower, blooms freely, and will stand more drouth than anything else except a cactus, and on ordinarily dry soil does not suffer from the excessive moisture of our rainy season.

The only drawback to its cultivation in this state is its susceptibility to frost. When nearly dormant the old stems will stand several degrees of frost without serious injury, but if growing freely, they will be killed to the ground at from 26° to 28° above zero. Yet if the roots and lower part of the stem are well banked up with earth in the fall, the former will survive a severe freeze, sprout quickly on the return of warm weather, and make a luxuriant growth.

In contrast to the pereskia, which grows so well in the open ground, the different species and varieties of phyllocactus must be grown under shelter to protect them from sun and rain, as well as from frost. Most of them bloom freely, and the blossoms are usually very showy.

Within the last year I have had blossoms upon several curious varieties of cactuses that are not common in cultivation, and are still more rarely seen in bloom. About two years ago I received from a friend three little offsets of some species of cactus without any name. They were almost round and very small, none of them being over 1¼ to 1½ inches in diameter. The three were potted in one four-inch pot, in rich soil. They grew quite rapidly, and by May, 1889, were from 2½ to 2¾ inches in diameter, and about 2½ inches high. About that time the largest of the three bloomed, and proved to be *Echinopsis Zuccariniana*. For several weeks after its first appearance the bud seemed to be merely a little point covered with black woolly hairs; but towards the last it grew very rapidly. When it bloomed, the tube of the flower was about six inches long. The flower itself was pure white, and from 3½ to 4 inches across when fully expanded. There was a little fragrance, but only a very little. It began to open just before sunset, and was fully open by eight o'clock P. M.; it began to close about daylight, and by eight o'clock A. M. its beauty was gone, and it hung limp and withering on its stem. These plants were kept dormant all the past winter and until quite late this spring. They were then repotted, and have not yet bloomed this season.

Another cactus rarely seen in bloom is *Rhipsalis salicornoides*. This is quite a long name for a very small plant. It lacks what is considered the special distinguishing characteristic of the cactus, viz., thorns. I have several plants of this species; the two largest, two years old, bloomed in February. The tallest, nearly 10 inches high, had 16 blossoms; the other plant, just 6 inches high, had 30 flowers. The main stem of the largest plant is almost a quarter of an inch in diameter. There are numerous sub-divisions of the stem—branches they would commonly be called—composed of joints varying from one-half to seven-eighths of an inch in length, and in diameter from one to three-sixteenths of an inch.

The rhipsalis tribe is closely related to the opuntias and the flowers are very much like miniature "prickly pear" blossoms, except that they are longer than broad, and do not open out so flat. They are borne on the tips of the upper joints, and are orange yellow in color. Each one, when expanded, measures about three-fourths of an inch in length by about one-half inch in diameter. Being so small, one flower would not attract any special attention, and a half-dozen do not make a great display. But as a curiosity, the plant deserves a place in every collection.

This list by no means includes all the curious and beautiful species of cactuses that have bloomed here within the past year. All members of the family are curious, and they are becoming deservedly popular. No other class of plants is so easily grown, or gives such good results for the small amount of care required. I would specially recommend for trial as a house plant, *Pereskia aculeata*. It will not give as satisfactory results when grown in a pot as when planted in the open ground in our warm climate; but if given rich soil and plenty of sunlight, I believe it will fully repay all the care required to grow it.

St. Johns Co., Florida. W. C. STEELE.

SPINES AND PRICKLES.

A BATCH OF CACTACEOUS POINTERS.

CACTUSES IN LANDSCAPE GARDENING.—The expression which a landscape gardener gives to any piece of ground on which he works should be one that is appropriate to the climate and in harmony with the effects which nature has already produced about him. In this region we find but one cactus—the prickly pear. This is an insignificant plant that grows on sand dunes where the soil is so poor that it is only partially covered with vegetation. It is more curious than beautiful. If we come across a specimen, we experience the pleasure that one is apt to feel when he finds a curiosity, but not the pleasure we derive from looking at a beautiful shrub or flower. The prickly pear has an attractive blossom, but if one touches the plant he will probably regret it constantly for some time afterward, on account of the little spines that stick in his fingers. If this plant is used at all in pleasure grounds of the northern states, it should be placed where it will be discovered as if by accident. It would be quite suitable for a sandy knoll or a bit of rock work, where it will feel at home and not be crowded out by other plants. There are other kinds of cactuses that make very ornamental plants for the conservatory, and at certain seasons of the year these might be used about the house for out-of-door decoration, but we should not attempt to use them to give character to our landscapes.—O. C. SIMONDS, *Chicago.*

CACTUSES IN AFRICA.—Cactuses are used by the natives of the Soudan for hedging in their villages and gardens. Whether these cactuses, as the opuntia of the Mediterranean sea, have all been introduced from America, deserves closer investigation. Since the genus rhipsalis has been found in the Old World by Welwitsch in Angola, and by Thwaites in Ceylon, the pure American origin of the entire family may be doubted. But the berries of rhipsalis are greedily eaten by birds, and this genus could, therefore, cross the ocean more easily than the others. And the identity of the form found in India with a common American one favors this supposition.—*Grisebach, Vegetation der Erde.*

THE AUTHORITY UPON CACTUS.—The writings of the late George Englemann are everywhere accepted as the authority upon North American cactacæ. A German by birth, he early came to this country and settled in St. Louis. With the duties of a medical adviser, he combined the study of plants in the most critical fashion. He undertook the elucidation of large and difficult groups of plants, and he studied them both in the field and herbarium with consummate skill. He early turned his attention to the comparatively unknown floras of our great west and southwest, and he completed the best studies yet made of the plants of our cactus regions. He gave particular attention to such difficult genera and families as the cactuses, agaves, yuccas, pines, oaks, dodders, grapes, euphorbias, quillworts and junci. His collections form the nucleus of the museum of the Missouri Botanical Gardens in St. Louis. He died in 1884, at the completion of his seventy-fifth year.—L. H. B.

MAKING HERBARIUM SPECIMENS.—Living cactuses bear transportation well if young or medium-sized specimens are selected. The entire plant, or, if too large, a joint or cutting, is thrown in the shade for a few weeks to shrivel, after which the specimens are wrapped in dry hay or moss, and loosely packed in well-ventilated boxes. Treated in this way, they preserve their vitality for from six to sixteen months. Seedlings are easily raised from seeds thoroughly dried and packed *in situ*. If the fruit is large and pulpy, it is sliced to facilitate the drying, and should be kept from moisture, but exposed to a free circulation of air.

Herbarium specimens are best made by removing the flowers from the plant and pressing them separately in the ordinary way, after first sectioning some of them. When not too large, the fruit may be dried in the same way, otherwise it is halved and excavated before being put in press, the seed being air-dried. The entire stem, if small, or characteristic joints if it is compound, may be pressed till dry, after allowing it to shrivel; or if it is too large for this, a piece is removed showing the top, the insertion of several bunches of spines and of the flowers and some of the tubercles or ribs. Sometimes it is necessary to split and excavate these specimens, and cross-sections dried under light pressure are desirable. If the means of transportation permit, entire plants or well-selected parts are rough-dried without pressure. These "skeletons," preserved in boxes in the herbarium, are often more instructive than the more ornamental pressed fragments. When possible, it is also desirable to make alcoholic specimens of the flower and fruit.—*Botanical Gazette; adapted from Notes of the late Dr. Englemann.*

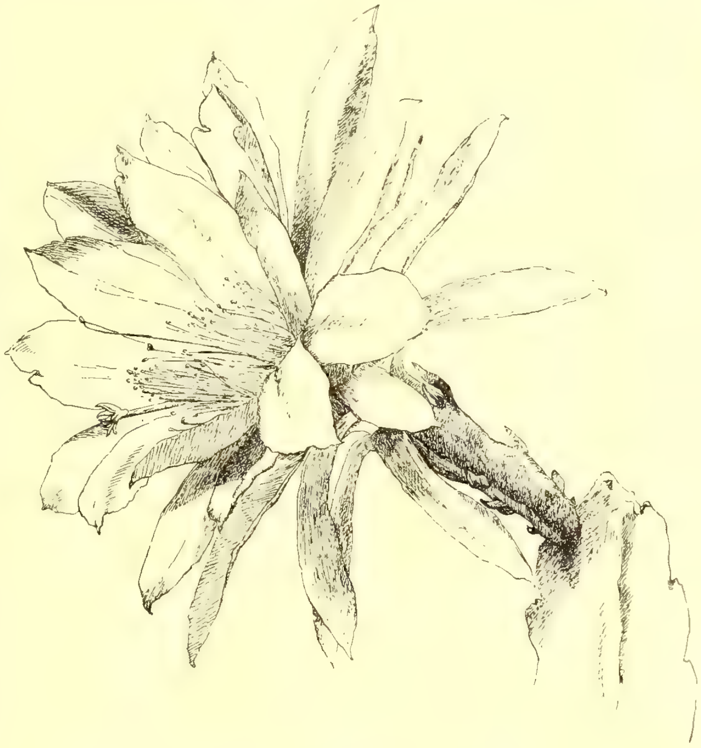


FIG. 1. HYBRID PHYLLOCACTUS.

THE NIGHT-BLOOMING CEREUS.—The night-flowering cereus (*Cereus grandiflorus*) has gained a fame which entitles it to prominent notice, and plants might well be included in every garden, for its flowering is a source of interest to the least observant persons. In the character of producing its blooms at night, it is not alone, as several of the slender-growing species have a similar habit, but none equal this in beauty and fragrance. [Two species commonly called night-blooming cereus are more correctly *C. nycticalus* and *C. MacDonaldiæ.*]

> "That flower, supreme in loveliness and pure
> As the pale Cynthia's beams, through which unveiled
> It blooms, as if unwilling to endure
> The gaze by which such beauties are assailed."

The flowers are really magnificent, and a plant with a dozen or two expanded at the same time has a superb appearance, particularly in the early evening when the flowers first expand, and the powerful fragrance they emit is very agreeable, having been aptly compared to vanilla. The stem is nearly cylindrical, with a few faintly marked ridges bearing small clusters of spines, and rarely exceeds one inch in diameter, but attains a length of many feet, freely branching. The flowers vary in size from six to twelve inches in diameter, the usual size being eight or nine inches. The sepals are narrow, acute and spreading, about one-quarter of an inch broad, four to five inches long, and thirty to forty in number, forming a beautiful fringe round the broader pure white petals, which are more in the form of a cup, the stamens being exceedingly numerous, with very long filaments.—*Lewis Castle.*

CACTUSES AS WINDOW PLANTS.—Cactaceous plants have much to recommend them to lovers of the curious and beautiful, but the majority also possess another very valuable character, *i. e.*, they are easily grown, so easily in fact that the cottager who can only devote a small space to them in his window may, and often does, grow many of them as successfully as the greatest magnate in Europe with all the most elaborate horticultural appliances at his command. In the dry and heated atmosphere of a room, which is so trying to most plants, they are perfectly at home, and their demands upon the attention of their host are so slight they may be left for weeks, nay months, without the smallest supply of water. It is not surprising, therefore, that many of the cactuses are favorites with dwellers in English towns, and many a toiler has had his heart lightened by a sight of the lovely flowers produced by his window "cactus," or has felt the pleasure of exhibiting his vegetable curiosities to his friends. Amateurs, too, in many other grades of life, have found in the cultivation of these plants the satisfaction which is derived from the constant study of the wonderful phases of plant existence; and though it can never be expected that they will rise to a popularity approaching that of the rose, yet there is a steadily increasing demand for them, and several nurserymen now make a specialty of them.—*Lewis Castle.*

SOME CACTUS HISTORY.—The word *cactus* or *cactos* was used by Theophrastus for a spring plant of Sicily, probably the garden artichoke. Linnæus used the word as a generic name, and made all the kinds which he knew species of it. Some of the species have been long in cultivation. The *Opuntia vulgaris* was recorded as a cultivated plant by Gerarde in 1596. In 1716 Bradley described five kinds of cactuses. In 1796, 29 species were known to botanists. In 1807, 20 species were described, and in 1811, 24 kinds were grown at Kew. In 1819, nearly 50 species were known, and in 1826, 94 were in cultivation. The explorations of Mexican and adjacent regions early in the century resulted in great additions to the numbers in European collections. In 1850 Labouret described 670 species. About 1,000 species are now known, of which perhaps over one-third are in cultivation.—L. H. B.

NOTES ON PHYLLOCACTUSES.—There are a number of good garden phyllocactuses, mostly artificial varieties, aside from those described by Professor Bailey in the August issue, p. 448: albus superbus, white and fragrant; alexandrina, violet; aurantiacus, orange; caulorrhizus, white, with pale green sepals; Conway's Giant, scarlet; Cooperi, yellow; Franzi, reddish purple; Haagei, salmon; ignescens, lustrous scarlet; Jenkinsoni, crimson; Pfersdorffi, white and yellow; stenopetalus, salmon and white, and the fragrant yellowish Wrayi. Two new sorts, Brilliant and Exquisite, were exhibited by the Messrs. Veitch at a recent meeting of the Royal Botanical Society, of England, and were awarded certificates, a fact which goes to show that hybridizers have in these plants something which can be turned to good account. The flowers are easily pollinated, and produce and ripen seeds readily. Fig. 1 (page 537) shows a good hybrid phyllocactus.

The phyllocactus will succeed admirably in a sunny greenhouse or window, but care must be taken to keep frost at a safe distance. Although these positions are desirable, they are by no means necessary, for by placing the plants in a dry airy cellar they may be kept in perfect health throughout the winter. The development of new branches usually succeeds the flowering period, but occasionally these phenomena proceed contemporaneously. To pot the plants (should that operation be necessary) to the greatest advantage, the work should be done immediately after the flowering stage, and even if they have made a little growth in the meantime, the operation has no hurtful result when performed with ordinary care. Where it is desirable to make large specimens of small ones in the shortest possible space of time, the most satisfactory results will be obtained by potting every year, but pot-bound plants flower much more freely than those that are treated in this manner. Good drainage is strictly essential, as the plants like a free supply of water when growing actively, but are quick to resent anything in the way of stagnant moisture. Rich loam, peat, decomposed manure, and sand, in equal parts, make a highly satisfactory mixture for potting. Occasional applications of liquid manure, during the season of growth will be of material aid to specimens which have not been repotted during several successive years. It is very advantageous to keep the plants in a moist, warm atmosphere while growth is in progress, but they thrive very well in the open garden from the middle of June onward through the summer months. Those plants that are kept under glass during the growing period should always be placed outside

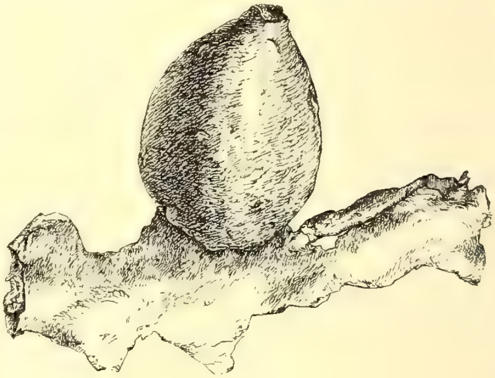


FIG. 2.

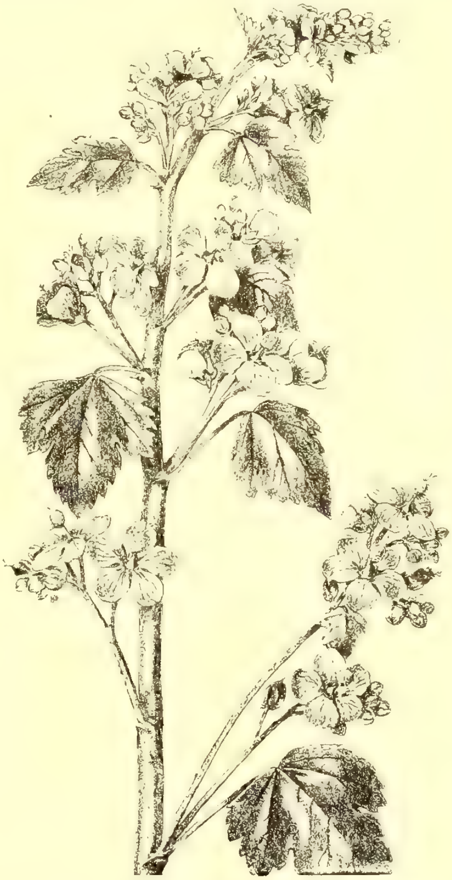
when growth has been completed, in order that the new material may be perfectly ripened by free exposure to air and sunshine for a few weeks. The supply of water must be reduced on the completion of growth, and in winter only sufficient will be required to keep the soil from becoming powdery.

Propagation is readily effected by planting cuttings of the stems in sandy soil, and placing them in a warm position, where they may be kept dry (excepting an occasional slight syringing) until rooted, when they may be potted in a more substantial compost. Thoroughly ripened seeds germinate freely when sown in a sandy mixture and placed in a position which affords moderate warmth. Keep the soil moist until the seedlings appear, and then, until progress seems certain, maintain a slightly drier state.

The fruit of the phyllocactuses is peculiar and well worth seeing. Fig. 2 shows a fruit upon an old branch of *Phyllocactus anguliger*.—G. H.

Some Hints.—My first recollection of a cactus was of a night-blowing serious which my mother had. It was much older than I was, so they said, and for twelve weary summers and thirteen blustering winters I stubbed my toes against it and pricked my fingers on it, before I ever saw it blow. We tugged it out in the spring and in again in the fall, and father and I declared every time that we would never do it again. It didn't seem to grow any, and yet it got heavier every time we moved it; but mother knew that it grew, and stuck to it, because it was bigger than when she got it. Father used to say that there was no blow in it, anyhow, and wanted to cut it up for kindling wood. But mother knew that it would blow, and she wasn't going to have it destroyed just because a man didn't have any love for flowers. But I think she would have given it up before I was born if father hadn't wished the thing was in Guinea! There is nothing like adversity to discipline one's character, and so she stuck to it. The old women said that it would blow at midnight when it got to be twenty-five years old. Finally a little tumor began to bud out of one side of the dry stalk, and mother said that her serious was going to blow! She watched it day after day, and became more certain the more she looked at it. But father hung to it that there was no blow in it, and said that the bunch was nothing more than a vegetable boil. But he finally had to give in, and then he became interested. All the neighbors were notified, and it was agreed that as soon as the flower began to open we should ring the dinner bell, and every one would get up to see. One morning father discovered that the thing looked like cracking open, and he became so excited that he stayed home from election to water the plant and repaint the tub. That night we all sat up till midnight, but the bud didn't open; and the next night we did the same thing. But father's hope was up, and he wasn't going to let any blossom get ahead of him, although mother said that it was a shame for any sane man to make more fuss about a posy than he did about his family. So we stuck it out for five mortal nights. The sixth night the thing opened, but either our clock stopped, or the plant was nonplussed by so much water and paint, for it opened at ten o'clock! The bell was rung, and in less than ten minutes the neighbors began to tumble into our yard in all sorts of hideous garments. Father fairly danced with excitement, and said that he didn't care if all his potatoes were trampled down, for he wanted everyone to see. Mother said that he made a fool of himself.

The next morning we were up at daylight to see it again, but it hung down like a dead rat. Father was disgusted, and said he wouldn't have a flower which didn't last longer than that. Mother said he ought to know by this time that the choicest things were always short-lived (she had always been in poor health herself and that he had no appreciation of beauty anyway. It all made a great impression on me, and I remember that I recorded it in my spelling book as follows:



The "Sunset Plant." (See page 541.)

"We played 'ring 'round the rosy'
When mother's cactus posy
Blowed!
All the neighbors wanted seed,
And expectations, like a weed,
Growed!"

And even now, when I see a mournful cactus plant, I always think what a lot of sitting down will have to be done before it will blow!—R. T. Choke.

HOW DO YOU INCREASE YOUR PLANTS?

THE amateur is often perplexed as to how to propagate plants in ways that are at once simple and successful. Fig. 1 shows perhaps the simplest way of increasing plants, but it is of use only for a certain class, as the rex begonia, gloxinia, sempervivum, gesnera and echeveria. To get several plants, cut the leaf with a sharp knife at *a*, *b*, *c*, etc., and each piece will root and form a plant. These pieces can be placed in sand as directed for other cuttings, or they may be laid on sandy soil in a moist, shady place, as on the soil of plants occupying large pots, weighted with a little sand.

Layering, as in Fig. 2, is a favorite way of propagating clematis, wistarias, honeysuckles, tecomas, grapes, passion flowers, etc., and differs from propagation by cuttings in that the layers are attached to the parent plant until roots are formed. *a* is the main plant, *b* the portion above the surface, and *c* the part covered with soil, from which the roots emerge. Some bushy plants, like the hibiscus, quince, cercis, (Judas tree), Paradise apple, etc., instead of being bent down and buried, merely have earth hilled up to cover the lower parts of the branches, and this being kept moist, roots will start from them, when they can be divided and planted singly.

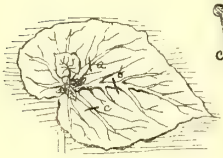


FIG. 1.

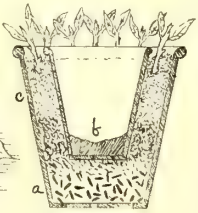


FIG. 6.

A variation from ordinary layering is shown in Fig. 3, where the plant is too tall for bending over, so a pot is broken in two and the pieces are placed around the stem, then tied together, a support arranged, and the pot firmly filled with soil, which must not be allowed to get dry. After the plant is well rooted the stem is cut below the roots and the new plant is grown on in a new pot.

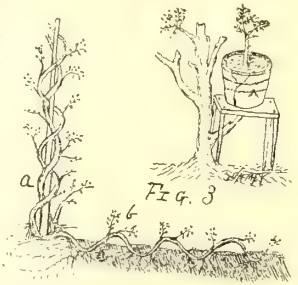


FIG. 2.

Fig. 4 shows another mode of layering for low branches of trees or shrubs. As shown at *a*, a long cut is made on the lower side of the limb, and when the latter is bent in the ground and pinned down, the cut parts and aids the formation of roots. A piece of wood may also be inserted to prevent the parts from growing together, as they might, instead of rooting. The same method is shown at *b*, except that instead of a tongue being cut on the limb, a ring of bark several inches wide is removed, and then the limb is pegged down.

Fig. 5 represents several cuttings placed in the sand ready for rooting. *a* is a cutting of the oleander, *b* of the carnation, and *c* of a geranium. For making cuttings, the wood should be in a proper condition, and as a general rule, this is the case when it will break off clean when bent. It is important to observe this, otherwise failure often results, the wood being either too soft or too hard.

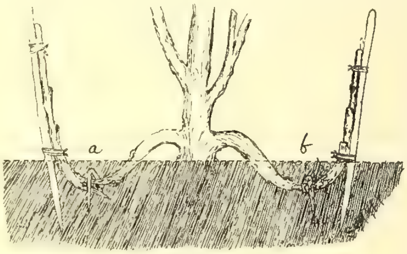


FIG. 4.

Fig. 6 shows a simple and at the same time one of the best contrivances for rooting cuttings that might fail in an ordinary cutting bed. A pot, 7 or 8 inches in diameter or smaller, is partly filled with broken pots, *a*, coarse soil, etc., and then a 4-inch pot with the hole closed with clay, *b*, is set in the center, and the sides, *c*, are filled with sand. This can be placed on the back of the stove for bottom heat, and the inner pot be kept filled with water. It may also be used for sowing seed, by using sandy soil instead of pure sand. Certain success in starting *Cobea scandens* may be assured by using such a pot, and setting the seeds in edgeways and right end up.

Fig. 7 illustrates the way of preparing a common box for rooting even quite difficult subjects, like double petunias, double primroses, pansies and others. A box, *a*, 3 or 4 inches high is taken, and for use in the house a water-tight lining (painted tin or galvanized iron) is fitted inside; and between this lining and the sides and ends, enough space is left to allow glass, *b*, to be inserted and held firmly in place. The glass should come about 10 inches above the box. When the latter is filled with sand, it should be set on the back of the kitchen stove, if quite light, or over a hot-air register or on the steam radiator, kept properly watered and covered with glass. No better propagator can be desired. Once

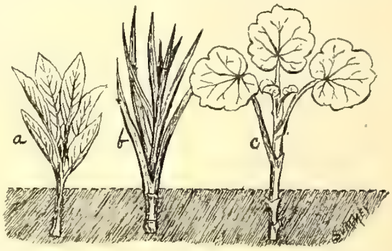


FIG. 5.

a day the cover may be raised for a short time for ventilation, and as the moisture does not evaporate very rapidly, but little water is required; but one should be sure that the bottom of the sand does not dry out from the heat while the top remains wet.

An interesting way of increasing one's stock of choice dahlias and pæonies is by root-grafting. Young shoots of the desired varieties are inserted into the neck of a fleshy root of a common sort, by cutting out along the upper end of the root a triangular section, large enough to admit the shoot when pared to such a shape that the outside of the root and of the shoot are exactly even; they are then planted, a band having been placed around to keep them in place until they have fully united by new growth.

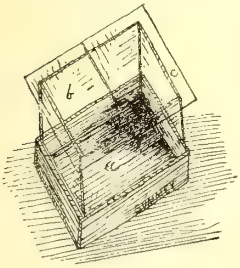


FIG. 7.

An old-fashioned plan that may be quite useful to the window gardener who, having but a few plants, might desire something still more convenient than these mentioned, is simply to take an old soup plate half or three-quarters full of clean sand, and nearly fill it with water. Rain water is preferable, though not essential, there being but little if any difference in the growth of the plants whichever is used. Cuttings can be taken from all of the ordinary house plants, such as geraniums, including the ivy-leaved section, fuchsias, coleus, tradescantias, verbenas, begonias—both the flowering and the foliage class—abutilons, carnations, chrysanthemums, lantanas, roses and salvias. They should be rather short, and stuck into the sand on the plate so that about one inch is below the surface of the water, which should be renewed as it evaporates. For the first week they should be shaded during the sunniest part of the day if in the window, and when uncovered should be lightly sprinkled at short intervals. The proper place, however, for this miniature propagating case is where it can receive some bottom heat, especially during the winter season, and there should be light enough to keep the leaves from losing their color. With this care, which any one can easily give, nearly every cutting will root, and if potted into good soil, all will make fine plants. Hard-wooded plants, like the oleander, may be readily made to root by placing mature shoots in bottles kept filled with water.

Many of the finest flowers are easily raised from seeds; but often the seed is so small that it is difficult to provide suitable conditions for its germination. By following this method I have obtained uniform success, and others may be equally fortunate: A shallow box or dish of any sort or size can be used. First in importance is drainage, and for this, broken pots or somewhat coarse coal clinkers from the stove are the best materials. The box is so filled with these that there is space for only about an inch of soil on top, and in arranging this, the coarsest parts should be next to the drainage stuff, and the soil on top should be as fine as possible, so that the minute roots are able to take hold of the nourishment in the soil as soon as they emerge from the seed. The best covering for almost all kinds of seeds is thoroughly dried moss which has been rubbed in the hands or through a fine sieve until it has been made as fine as the soil, and then scattered over the seeds in a layer not thicker than a sixteenth of an inch. The first watering after the seed has been sown is a delicate operation, and is best managed by laying a piece of newspaper over the top of the box and pressing it down evenly upon the soil. It should be so large that the edges will come up somewhat higher than the edge of the box, and water poured into the depression will gradually soak through the paper and evenly moisten the seeds and soil beneath. As soon as the seeds show signs of sprouting the paper can be removed, but great care must be taken that the plantlets are not allowed to become dry at this critical period. As a rule, seedlings should be transplanted as soon as they can be handled, for a sort of fungus often kills them in the seed box; and their progress is much more rapid for the early transplanting.

HORTUS.

THE "SUNSET PLANT."

DURING the winter of last year a catalogue was received from the Lewiston (Idaho) Seed Company which set forth in glowing terms the striking beauty and rare merits of what it believed to be a new plant. It was advertised as the "Sunset Plant," and the company was making efforts to ascertain its place in botany. At our request, a single specimen was sent to the Rural Experiment grounds in January. It grew vigorously and began to bloom in early May. The flowers start from the axils of the leaves, as shown by the very accurate accompanying engraving (page 540), and are borne on short petioles in clusters of two, three or four. The petals are heart-shaped, five in number, and the flowers, of a salmon color, are about one inch in diameter. The color of the buds is a pleasing shade of deep orange. The plant continued in full bloom until it was set out in the open border, where it again began to bloom in late July. The roots wintered safely, and new shoots appeared in early May, which began blooming about the first of June. The stems are about two feet high and need support. The leaves, as shown, are in form like those of the currant, and of a light glaucous color. The whole plant has a general resemblance to *Malva rotundifolia*, the "cheeses" of the young people. The name of this malva we found to be *Sphæralcea Munroana*, formerly *Malvastrum Munroanum*.

The Lewiston Company wrote us last year as follows: "We removed a plant to our grounds four years ago, which is now probably eight or ten years old. The plant was then perhaps four feet across and three feet high. It is now seven feet in diameter by four feet high, with 100 stems, all of this season's growth. The leaf and stem also show a proportional increase in size. We are pleased to learn you have decided upon its identity. It has been sent to a great many for identification, but you are the first to locate it."

This "Sunset Plant" will grow readily from seed. We find it offered in some catalogues under the name *Malva miniata*.

It is not without some merit. In the earlier part of the summer it bloomed with great freedom, and was fairly covered with foliage. At present, however, the lower leaves have withered and dropped, so that its beauty for the season is past. It is growing, however, in a very dry, hot situation. The illustration shows a terminal shoot reduced to one-third its natural size.

E. S. CARMAN.

Rural New-Yorker.

CULTURE OF THE ENGLISH CUCUMBER.

IF RIGHTLY managed, the English cucumber is one of the most satisfactory of forcing vegetables, but, while not difficult to grow, any tendency to neglect on the part of the gardener is soon manifested. On the other hand, a little extra care is well repaid, both in appearance and in cash returns.

The ideal house for cucumbers is one which is large enough to allow the vines to attain a good size without interfering with each other, which has rather a flat roof, and which will allow ventilation without permitting a draft to strike the plants. A large house is also preferable to a small one, because the larger volume of air is not so quickly affected by outside conditions. In building a cucumber house, I should advise 18x60 feet as a good size. This will allow three-foot tables on each side, and a six-foot table in the center, with two three-foot walks, as shown in the diagram. (Fig. 1.)

The center table may, if desired, be used for snap-beans, which require about the same conditions as cucumbers. With proper care, however, any forcing house of modern construction may be made to answer very well.

Any time after the first of September the tables may be prepared for the winter crop. In arranging the tables, it is well to leave a space of three or four inches on the back side for the escape of warm air next to the wall and the glass. Good drainage is of the first importance. To secure this, place about an inch and a half of charcoal, broken crockery, or "clinkers" from the furnace, on the bottom of the table. Next, put on a good layer of partially decayed sods; then fill to the depth of eight or ten inches with thoroughly prepared soil, consisting of two parts fibrous loam and one-part well-rotted stable manure, with sufficient sand to make it porous. No time spent in doing *thoroughly* the work of preparation is wasted.

The seed may be sown in the soil as prepared, or may be started in pots and afterward transplanted. I prefer the latter method. In either case, a crop of string beans may be taken from the tables before the cucumbers are large enough to interfere. The wise gardener will improve every opportunity to take a catch crop from the house.

The plants should be about four feet apart on the tables, thus giving abundant room for the lateral shoots, which should be trained "fan-shaped." For supports to which to train the vines, horizontal parallel wires, one foot apart, may be run the whole length of the house. The wires should be about a foot from the glass; otherwise, the foliage will be subject to injury from cold draughts, which come in where the glass overlaps, and from scorching on very bright days. Instead of permanent wires for supports, some prefer frames, which may be more easily removed at the close of the season.

When the vines are about two feet long, the terminal bud of each should be pinched off, to induce the production of lateral shoots. The laterals, in turn, should be pinched back, and the vine made to grow symmetrically. As the fruits develop, the

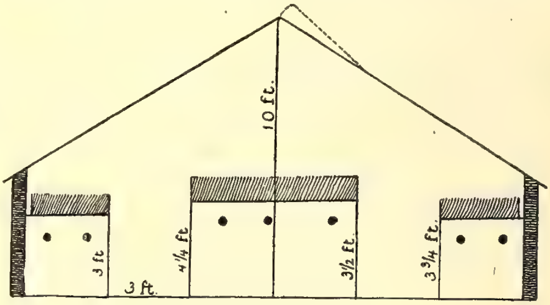


FIG. 1. CUCUMBER HOUSE.

larger ones must be supported by strings, for if allowed to rest on the soil, they become ill-shaped and consequently unsalable, and if left free, the vines are likely to be torn loose.

Too much stress cannot be laid on the importance of giving attention to the details of watering and the general care of the house. A warm, moist atmosphere is essential to the best results. A night temperature of 65° should be maintained, and in sunny weather the walks should be thoroughly dampened night and morning. With proper precaution concerning drainage, there is little danger

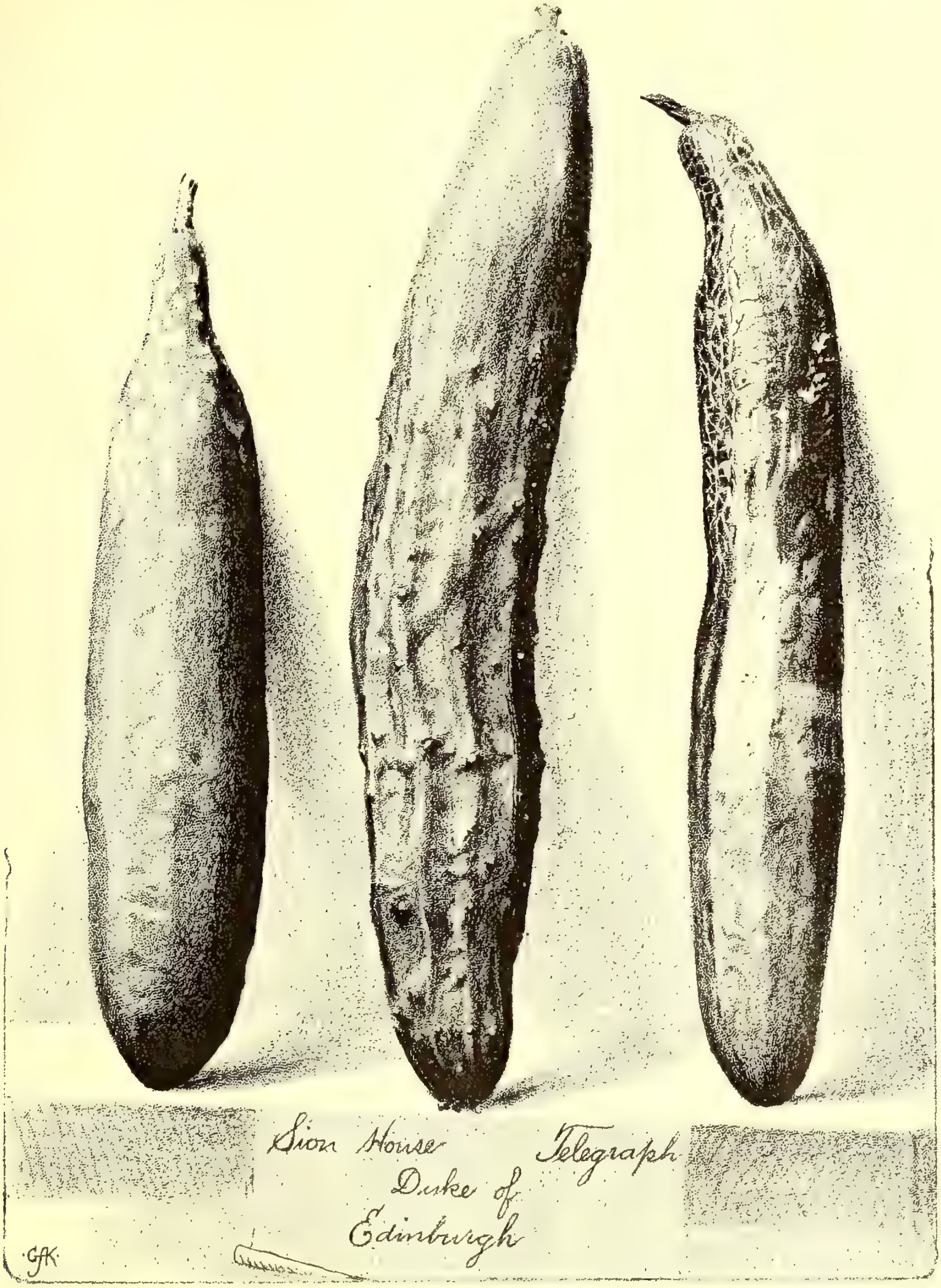


Fig. 2. Three Good Forcing Cucumbers.

of giving too much water. But, of course, judgment must be exercised. An occasional spraying of the foliage with tepid water is of advantage in keeping down the red spider.

About once in ten days give a good dressing of liquid manure. To procure this, take an old barrel, bore some holes in the bottom and fill with manure. Then run a few pailfuls of water through as desired.

The most popular varieties are Sion House, Telegraph and Duke of Edinburgh. Fig. 2, from a photograph, shows a typical fruit of each variety as grown in the Cornell forcing house last winter. The fruit of Duke of Edinburgh was twenty inches long. As will be seen, this variety is too large and coarse to be attractive. The average length is sixteen to twenty inches, often more.

Telegraph is a very handsome fruit, of excellent quality. The spines, seen on Duke of Edinburgh, are absent. It sells well when large fruits are wanted, but for private families its large size is an objection.

For general culture, I regard Sion House as preferable to either of the others. It is of medium size, averaging about fourteen inches in length, smooth, handsome and very prolific. Fig. 3 shows the character of this variety. At the time the photograph was taken, many fruits had been cut, and the vines continued in profitable bearing for two months afterward. Near the upper left-hand corner of Fig. 3 may be seen a large ill-shaped fruit, the result of artificial pollination. This leads me to note the fact that, unlike the American cucumbers—White Spine, etc.—the English varieties require no artificial pollination under glass.* If pollinated, the results are usually as seen in the cut. Seeds are developed in the enlarged portion and the fruit is rendered unsalable. When left without interference, perfect seeds are rarely, if ever developed, and the fruits assume the the regular form shown.

To recapitulate: Successful culture of English cucumbers demands a roomy house; rich, porous soil with good drainage; a warm moist atmosphere, plenty of water at the roots, frequent applications of fertilizers, occasional spraying with warm water to keep down insects, care in training, and selection of the best varieties. With these conditions, good results can be attained.

Cornell University. W. M. MUNSON.

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* The whole subject of the fertilization of the cucumber fruit is an exceedingly interesting and important one, particularly under glass, and it is not well understood. The cucumber culture about which Mr. Munson writes was undertaken for the purpose of investigating this point, and it will be continued for the same purpose until definite results can be announced.—L. H. B.

VEGETABLE GARDENING FOR WOMEN.

BY ONE WHO LOVES THE GARDEN AND WORKS IN IT.

THERE is every reason why anyone who has a piece of ground large enough should have an abundance of fresh vegetables and relishes. In the spring, when you clean out the cellar, save a few rutabagas or Swedish turnips and set in the garden; in two or three weeks the fresh young leaves will be large enough to pick for a salad. Lettuce seed sown in a hot-bed or cold frame can be transplanted and give you early lettuce, or if the old bed is not disturbed it generally self-sows, so you can find plenty to transplant. Early Silesian is a good variety. Green-fringed is another good variety for home use, and ornamental. White Cabbage is tender and a fine variety. forming solid white heads.

Radish seed should be sown early. The Olive Scarlet, Scarlet Turnip and White Turnip are all good varieties. Sow at intervals. If the weather is dry they get strong and pithy, but when there is plenty of rain, and they grow quickly, they are delicious. If you have a large garden and the time to weed it, sow more than your own family can use, so you can divide with your less fortunate neighbors.

Garden peas are very hardy, and should be sown early; then in two weeks sow again; also a late variety, and in this way you will get a succession of garden peas fit for a king to eat. Sow about four inches deep in rows, the dwarf varieties one-and-a-half to two feet apart. The tall varieties should be three feet apart and brushed as soon as they are hoed. American Wonder, one of the earliest of the wrinkled peas, is dwarf and very productive. Little Gem is very dwarf; a sweet and excellent variety. The Champion of England is a standard variety, and one of the sweetest and best peas in cultivation; it needs to be brushed, as it grows five feet high.

Do not plant beans too early, as they are tender and are easily killed by frost. They do not require a rich soil. Plant in hills or rows. The German Wax is an excellent variety. The Golden Wax is early and stringless. The two varieties mentioned above are dwarf. The Lima bean is a strong grower, requiring only two vines to each pole; has very long pods. The Large Lima is a delicious bean.

We find a good many excellent varieties of the beet. Among the earliest is Egyptian Blood Turnip. Eclipse is an excellent variety, and early. Sow in rows and thin out when large enough, and use for greens.

Evergreen is an excellent late variety, and remains green a long time.

Cucumbers do better if you do not plant the seed until the last of May or first of June. Plant in hills six feet apart, and do not neglect to plant a few radish seeds in every hill, as they prevent the striped bugs from eating the cucumber vines. The middle of June is early enough to plant cucumbers for pickling. Frame and Cluster are good varieties. If you wish them to bear well, keep them all picked closely. Do not let any go to seed on the vines.

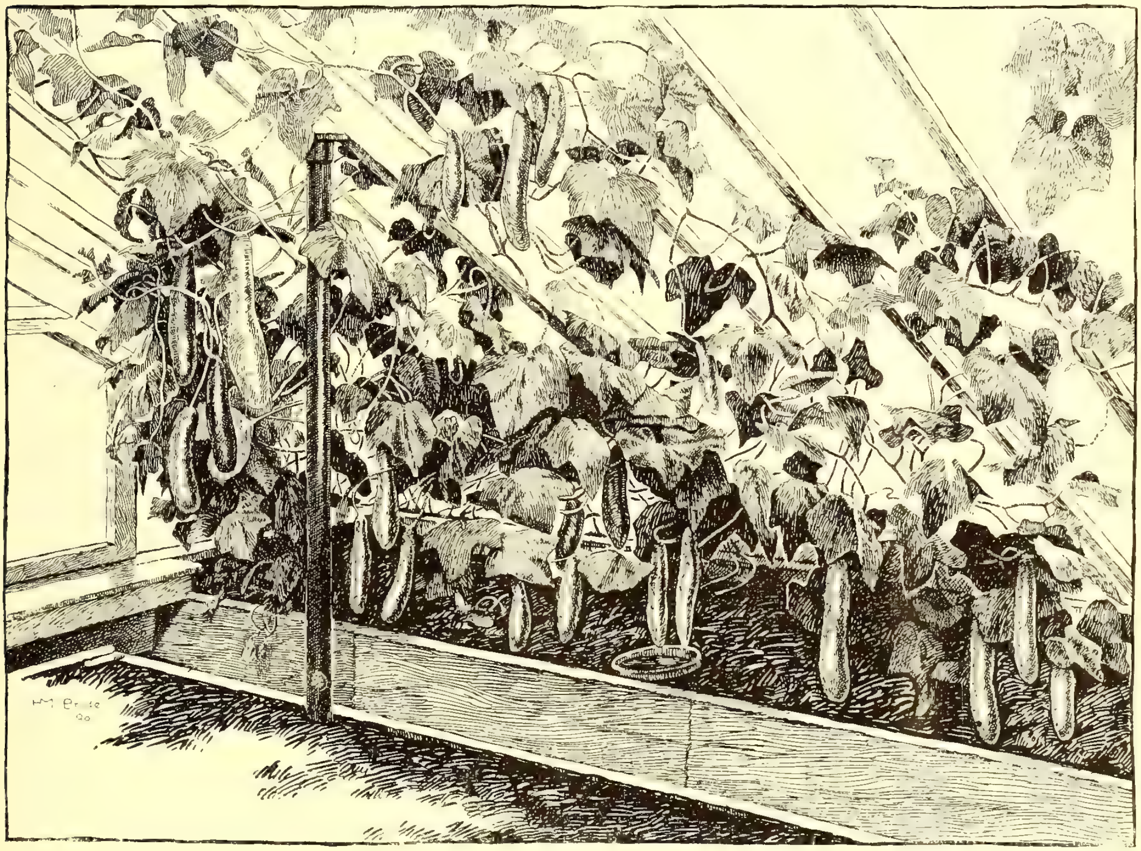


FIG. 3. A BENCH OF SION HOUSE CUCUMBERS.

For early onions, the silver-skinned are white and good in flavor. Danvers Globe is a choice variety. It is better to use "sets" for early onions. When they get well started, roll a barrel over your onion-bed and the bulbs will grow faster. Do not hoe the dirt up around the onions, but let them grow on top of the ground.

Give sweet corn a good sunny location and use the best seed you can get. Minnesota, Russell and Crosby are all good and early varieties.

Among the summer squashes, we prize the White Bush Scallop, which requires very little space. Plant in hills, three feet apart. The Summer Crookneck is early and good. For autumn and winter use, the Hubbard is a standard favorite. The Bay State is a new variety, and very good.

If you are fond of parsnips, sow seed in latter part of April, and in the fall harvest what you wish and leave some in the ground until spring. The long Hollow Crown is a good variety.

It is much less trouble to get tomato plants than to raise them from seed. It is well to set a few plants early if you can cover them on cool nights until all danger of frost is over. The 15th or 20th of May set more plants. Hoe often and trim off side branches. Do not set the plants too near together, as half a dozen plants will furnish more tomatoes, and ripen earlier, if you give them space enough, than twice as many crowded together.

Swedes or Rutabaga turnips should be sown early in June, about half an inch deep. About the middle of July clear away the old vines where your early peas have grown, spade the ground and sow seed of common or English turnip from the 20th of July until the middle of August, and if there is plenty of rain in September, they will grow and mature before cold weather.

Peppers are valuable for seasoning and for pickles. The Sweet Mountain and Large Bell are good varieties. You can get plants at the greenhouse and set in garden when the ground is warm, the latter part of May, or sow in hot-bed and transplant.

Do not hoe up all the "pusley" when at work in your garden, but let some get large; then pull up and cut the roots off and throw in a market-basket; shake the loose dirt off and wash in several waters. Cook as you would greens, drain through a colander and get all the water out, then chop fine and season with salt and butter. It is delicious.

For early cabbage it is less trouble to get the plants from a gardener. Set the plants toward evening, or after a rain, from one foot to fifteen inches apart. For late cabbage, you can sow your own seed if you prefer. Some sow two or three seeds in a hill, and pull out all but one. The large varieties should be set nearly three feet apart. Early York and Early Wakefield are good for for summer use. The Late Drumhead, Flat Dutch and Stone Mason are excellent varieties for fall and winter.

The cauliflower requires a rich soil and plenty of moisture. Seed can be sown in hot-bed or even in open ground. For late cauliflower, sow seed on the north side of a building or a close fence about the first of May. Transplant toward evening or just after showers, about 20 inches apart. Snowball is one of the earliest varieties, and reliable. Italian and Algiers are good varieties.

No garden is complete without a bed of parsley. It is a handsome plant, and valuable for garnishing and flavoring. It is very slow in germinating, so it is well to sow with it a few radish or some other seeds that come up soon, so that you can have the use of the ground and keep the weeds out. It is often several weeks after parsley seed is sown before it comes up. It should be soaked in warm water before planting, to facilitate its sprouting. Double Curled is a good dwarf. Champion is an English variety, curled and mossy. Fern-Leaved is good for garnishing.

It is surprising how few people raise sweet herbs. There is nothing more useful in preparing food. The leaves of celery and parsley should be saved and dried. Pick when ready and dry quickly in paper bags to keep the dust and flies off. Dry in the sun or warming oven. When dry, put in paper sacks or glass cans. The many uses you will find for them will easily repay for the trouble.

Illinois. MRS. M. J. ASHTON.

NITROGENOUS FERTILIZERS.

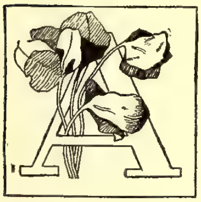
IN THE series of articles entitled "Fertilizers for the Garden," by Joseph Harris, No. XII, in the May AMERICAN GARDEN, criticises the *Rural New-Yorker*, which, for several years part, has deplored the indiscriminate use of nitrate of soda, or of soluble nitrogen in any form, unless it is well known that the land is amply supplied with the essential mineral food constituents of potash or phosphoric acid. In the *Rural's* reply, which appeared in the June number, the editor of that journal endeavors to impress it upon our readers that, if we err at all, gardeners and farmers had better err on the side of economy, and use nitrogenous fertilizers in an experimental way, so as to ascertain to what extent it may profitably be applied. In general, it is safe to say that we may apply potash and phosphates to our land in unlimited quantity, since they remain in the soil for the use of future crops, if not needed by those of the current season. Not so with the costly soluble nitrates or salts of ammonia. All that is not used by the current season's crop is virtually lost.

The *Rural* editor's views, as expressed in his reply to Mr. Harris, above alluded to, have been forcibly corroborated by a pamphlet written by Prof. Paul Wagner, director of the Agricultural Experiment station at Darmstadt, Germany, and translated by Prof. Charles Wellington. He holds that to place in the soil a surplus of phosphoric acid and potash is quite right, while nitrogen should be measured out as accurately as possible.

How much phosphoric acid is needed in a particular case, *i. e.*, for a particular plant on a particular soil, in order to produce the greatest possible yield, cannot be closely calculated. The one soil is rich in potash, the other poor; the one rich in phosphoric acid, the other poor. The one crop needs much easily soluble potash or phosphoric acid, the other little. The one soil yields the phosphoric acid, applied in easily soluble form, directly; the other renders it less soluble, and demands a relatively heavier manuring to produce an equal result. The one soil has never, or very rarely, received phosphates, the other large quantities almost yearly; and it is possible that the latter possesses a store equal to the demand for several years. How can the farmer find his way through all these difficulties? He cannot. Nothing remains but to apply an excess of both food constituents; and in this there is indeed no danger, for potash and phosphoric acids are substances which the soil binds up and preserves for later crops, in case the one immediately following demands them only partially or not at all. With nitrogen it is quite different. Nitrogen is not bound up by the soil: it remains freely movable. The residue from a crop would be in danger, during the winter months, of being washed into the subsoil and lost.

E. S. Carman.

NOTES OF GOURDS.



A GOURD, or a melon, botanically speaking, is not always something good to eat, or in some other way useful. The Latin word *cucurbita*, or gourd, gives the name to an extensive family of vine-like plants, some of which climb and others do not, all of which bear fruits, or what are botanically regarded as such, some of which are among the most inviting that come upon the table. Others are bitter and medicinal, as the colocynth of Palestine, and others again are rank and nauseous. What is usually regarded as a gourd[*] is a hanging fruit, which at maturity has a hard wood-like rind and contains a pulp, very bitter, that dries almost entirely away, leaving little but what holds the abundant seeds of the fruit. One peculiarity of the plants producing what we call dipper gourds or calabashes is the musk-like odor that most of them give out when their leaves are pinched.

We generally look upon a gourd as something unsuitable for the table; but this is an error, as when cooked, several of the species of Syria, Japan and Brazil are palatable when prepared young, especially those which grow long, thin and green, like the Hercules' Club.

One sort furnishes the reticulated skeleton used as a bathing-scrubber and in making beautiful bonnets. It is sometimes called a "dish-cloth gourd," from one of its uses in our gulf states. In India the natives eat one of the varieties when quite young; but we never discovered anything to tempt one to test any of a dozen varieties we have grown in this city. The Sponge-bearing cucumber (*Luffa macrocarpa*) of Egypt and Japan will reach perfection in Philadelphia in five months, and will stand the climate from June 1st to November 15th; but the plants should be started in the house, to make sure of a crop, as the fruits sometimes set very late. The Egyptian luffa, described by Prosper Alpinus in 1645 among the plants and fruits of Egypt, is the one best suited to this country, and should be grown as a climber, although near Cairo, where there is no rain, it is raised over large tracts of land, as a cucumber is grown. Still, even in Egypt, the skeletons are often rendered dark and inferior by their manner of growth and preparation, as compared with some of silvery whiteness produced in this city on the south side of a wooden building where the sun reached them all day. Here, seeds planted in June, bore perfected fruits with jet-black seeds by November 1st, and I have not seen more silvery skeletons. We have tested seeds from Cuba, Egypt, India, China and Japan, and have found fruits that produced no network north of southern Florida, as they required that the plants should have a growth of eight months. A bower of these plants is a pretty sight, and the leaves of some of the varieties are beautifully marked. The most curious of all of the varieties, is the *Luffa noctiflora odorata*, which as its name indicates, blooms at night and has a perfume. It has a small drupe-shaped, ridged fruit, a thin network, smaller flowers than the other varieties, and seeds like a watermelon. As the flowers open at night and droop in the morning, I have secured seeds by doing the work of the bee with a soft camel's hair brush.

Philadelphia. Robert P. Harris, M. D.

(*) In England the term "gourd" is generic for all kinds of pumpkins and squashes.—Ed. Am. G.

TARRYTOWN LETTERS—XI.

BY A. B. TARRYER.

A RISKY INVESTIGATION—HOW SOWING "LAWN" GRASS DON'T MAKE LAWNS—HOW PARSON CAMPERDOWN'S LAWN WAS REFORMED—LADY SCHNIPTICKET'S OPINIONS—THE PUNISHMENT OF M'TAVISH.

THOUGH she is apt to be right all the while, Mrs. Tarryer's persistent spirit of investigation sometimes carries her into positions that make me feel rather nervous. The matter of Parson Camperdown's grass, in the heat of it, while it was the talk of the whole country-side, and was expected, by outsiders to produce permanent breaches between several excellent families, caused even Mrs. Tarryer to lose some sleep. It is all right now, and we wonder at the uproar and hard feelings that are past. These are worth recording as a warning and a comfort for urgent experiments and those who lead their friends into speculations which seem risky for a while, though they turn out ever so well in the end.

The Camperdown lawn was a large, pleasant door-yard, with a beautiful sward, depastured by favorite horses just out of harness, in the time of Mrs. Camperdown's father. She don't think it improved much since the greater part of it was used as a paddock for ripe lambs and wethers, and guests could tell by counting the flock from their bed-room windows, just how many head it took to supply Farmer Sothern's hospitable table.

The Parson had the ground trenched and the tile-drained soon after the old farmer died, making the grade more nicely rotund, but so stirring up the deep gravel—Mrs. Tarryer declares—that in places it has never stuck together enough since to afford capillary moisture during periods of drought. Many a load of loam and weed-seed compost has the Parson applied to that lawn, and by so doing even Mrs. Camperdown admits to her intimate friends that the Rev'd Dionysius has raised the land around the buildings and secured a moist cellar after every washing rain. Men are mistaken who think their wives do not understand their engineering feats!

Right in front of the house and just across the carriage-road is an open, sunny space where the grass has been nine-tenths *Panicum sanguinale* for years, in spite of this or that "lawn-mixture," raked in every spring.

"It is strange our grass should winter-kill where the drainage is so thorough," said Parson Camperdown, one sunny morning in March, regarding the great brown patches in front of his door, as we were ending a neighborly call.

"That grass was killed, dead as a door-nail, Mr. Camperdown, by the first hard frosts last fall. That is nothing but finger-grass you are raising there, sir. It is strictly annual in Tarrytown."

This dead sod of panicum the Parson stoutly denied—claiming his "last mixture was largely of *Cynosurus cristatus*."

"Oh, that cristatus is one of the things which never come up to spoil its market!" says Mrs. Tarryer, and then she triumphantly showed the Parson a handful of the old "fingers" full of seed, recumbent in the dead sod as rolled down by the lawn-mowing of the previous season. He had to give in.

It was about that time, no doubt, that Mrs. Tarryer really began scheming to make Mr. Camperdown work out his own salvation from that pestiferous weed. She told me on the way home that he might reseed till doomsday as he was going on, without ever getting rid of it. Or, being a woman of great forecast, she may have been educating him unconsciously for a public example all these recent years. At any rate, early in April a broad patch of the Parson's door-yard was planted in "dotted lawn," as figured in my July letter, and the Parson's Scotch-Irishman, Dingball, with one of Mrs. Tarryer's thrust-hoes, was to hoe and cross-hoe it, three times a week if necessary, to keep the weeds down.

There are a number of grasses under strict government in our garden which Mrs. Tarryer knows all about, but it appears that she had given the Parson a new pet of hers—a chance seedling in a poor, dry spot, where some seedsman's fancy packets had been sown. It had distinguished itself within two or three years by making a circlet of close turf about as big as a card-table, and as fine as moss. Dingball cut that moss turf in tiny bits of half an inch or more square, under Mrs. Tarryer's directions, and set it in straight rows each way, about fourteen inches apart.

What Dingball said, and what the frequent visitors and strangers, who often drove past the Parson's door to see what was going on in his preserves, said, would make a funny book and a valuable history of our graministic progress, but we must cut the most of that here.

Parson Camperdown entered into the scheme, at first, with a great deal of enthusiasm. You would have thought it was his own plan, to hear him talk about it. Mrs. Tarryer took him very cleverly on his antiquarian side. It is whispered that he has the fullest and most curious collection of chamber ceramics in the world, and that the very vessel with which the mother* of Marcus Aurelius despised the Roman sewers by emptying her slops on the grass of the campus, is one of the illustrious varities of his collection. The Parson also has on his bookshelves all the ancient and modern agricultural worthies, from Hesiod and Homer to Tusser, Jethro Tull, Maxwell, Stillingfleet, Laurence, and White of Selbourne, who called himself an "out-of-door naturalist." With these authors, Mrs. Tarryer is a great deal more familiar than Parson Camperdown is, but she showed him how the planting of sod, cut small, is an ancient and time-honored practice, and he caught on to that idea at once.

"Seeds vary," he said, "but a select sod has a long pedigree. If I ever bought good sward seed I never knew it at the time, and when I thought I had, afterward, and tried to get more of the same, our traders don't know where their seeds come from well enough to duplicate an order. But sod carries its life-history in its face."

Parson Camperdown imagined he got these views by reading, but Mrs. Camperdown knew where they came from.

Our troubles began as soon as the bits of sod were planted. Public curiosity was roused at once. Three local newspapers kept standing head-lines and sent reporters around twice a week to see what that grass was doing. Mrs. Camperdown, who was kind and cheerful, even in the darkest period, advised the Parson to put up a bulletin daily on the street opposite their entrance; bets were made at two or three wet groceries that "what the Parson has planted is twitch, or a kind of a twitch," and the academy boys had a rollicking song—nine abreast—about the "Camperdown gra-a-a-ass;" that, as I have hinted before, helped make Mrs. Tarryer's nights wakeful.

There was a week or ten days in June when it certainly looked as if that rampant creeping agrostis, impelled by frequent rains and too much soluble fertility, would cross the drive, scale the verandah and swamp the house. Mrs. Tarryer laughed easily, when she found that Dingball had used a bag of fertilizer instead of the half-bushel she had told him, and stopped the wild charge of the agrostis with a pair of shears.

This was the same day that Lady Schnipticket and Mrs. Tarryer met at the Camperdown mansion and had a conversation, the particulars of which have not fully transpired before this writing.

Mrs. Tarryer is no tattler, but she knows how to defend herself. After Parson Camperdown had told a four-horse load of Grangers who drove in from a pic-nic—repeating three times over in his loudest tone that "THE GRASS IS PROBABLY FIORIN!"—Lady Schnipticket undertook to read Mrs. Tarryer a lecture implying that she was too forward in introducing new species of plants in other people's grounds and forcing them into notoriety before the public in the most embarassing manner.

Where Lady Schnipticket's opinions came from was known perfectly well to Mrs. Tarryer. Her foctotum was a Scotchman by the name of McTavish. He made his first appearance in Tarrytown with Col. Schnipticket's body, and naturally remained after the funeral and made himself generally useful, as Scotchmen are abundantly capable of doing. McTavish knew more about the stable than the garden, and relieved Lady Schnipticket from horse-trading entirely, so that she generally had teams, double and single, that would be a credit to any lady. He had not been long in Lady Schnipticket's service, however, before there was talk about him and one of her maids, whose parents were well known too and appealed to Mrs. Tarryer; but the Scotchman married the girl and the affair blew over, though McTavish did not forget it and felt constrained—so it was said—by what he called "petticoat government." He and Dingball, and several other weedy gardeners in our vicinity, thought now was their time to make a stand.

You can well imagine that Mrs. Tarryer was not the woman to accept any of that Scotchman's mischief at second-hand through Lady Schnipticket. After hearing the lecture aforesaid, attentively, she shifted the shears into her other hand and led the dowager knee-deep into that tall grass and showed her how thoroughly it was covering the ground and springing up thick and fine as hair at the bottom, so that no weeds could live in it.

"Now my dear Mrs. Schnipticket, don't let the small malices of these gardeners make any difficulty between you and me! This grass is coming out all right, and will be lovely in the end. You don't know that either I or my boys and girls, without seeming to do it, have had to keep the weeds out of this grass ourselves. Parson Camperdown's man and your McTavish—I believe *he* is at the bottom of all the trouble—determined this grass should not succeed, and I have determined it shall!"

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*Mr. Tarryer is wrong in his history, but he may mean some other Roman matron.—ED.

Lady Schnipticket opened her eyes, then, as though she had just thought of something and insisted that Mrs. Tarryer should step into her carriage. There, the dowager was quite confidential. "I told McTavish the other day," she went on, "that he might as well trade with a Smith, a Brown or a Jones, sometimes, as with the eternal "Mc's" I am constantly drawing checks for. And do look at this piece of his impudence! It was mixed in with a lot of papers he handed me:"

"Mi dere Sandy yule haf to tek the sorel mare back
"she can't step with the gra nor with dandy and the ole
"woman ses she wont do at all
"yours M'TAVISH."

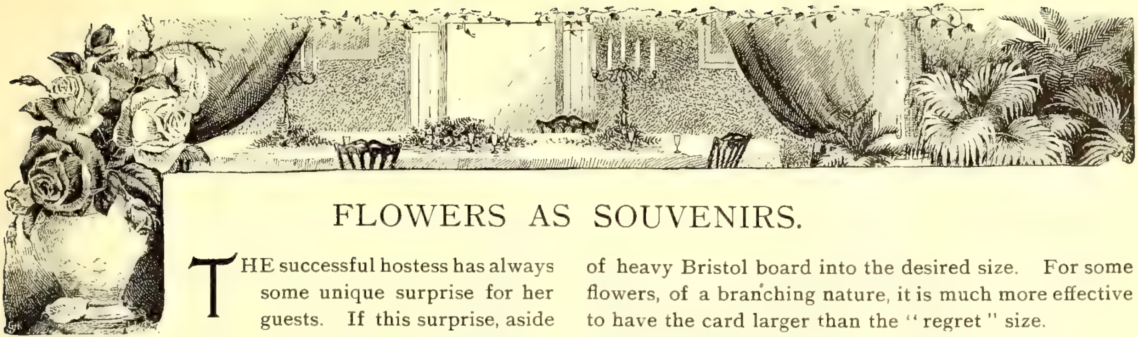
"I'll 'old woman' him, you'll see! He's been raking all manner of grass-seed bills into my weedy lawn—the stupid!—these twenty years, the same as Parson Camperdown has, without minding the annual grasses that are nothing but weeds. Now, my dear—that McTavish—'old woman' indeed!—shall manage my grass precisely as you say, or *pack!*"

After relating this interview—not much less in volume than a number of the GARDEN—Mrs. Tarryer admitted that Lady Schnipticket said one thing in her lecture that is worth repeating here: "The experiment stations ought to go into this kind of grass-work instead of leaving the people at the mercy of their ignorant gardeners and the seed-trade, who of course don't know any better."

Parson Camperdown's lawn is greener than an emerald with the one pure grass, now, and McTavish has every weedy spot on the Schnipticket grounds under half-summer fallow, in readiness for "dotted lawn" planting or pure seeding this fall or next spring. The weedy sod is first coated with fine clay loam and then carefully turned under, with a fertilizer, to receive a light dust of clay with a fertilizer on top. He makes the most obsequious of bows to Mrs. Tarryer, and the last boy-baby was baptized "Tarryer-McTavish," in genuine Scotch thrift. Lady Schnipticket says this sod-business shall be worked into our grass-science if she has to hire a lot of botanists and pay their board at Saratoga next summer to get it done!

[NOTE BY MR. TARRYER.]

One of the publishers telegraphs to know if the allusions to "the Scotchman" cannot be shaded, in fear of giving offence to a worthy nationality? Mrs. Tarryer declines to shade anything except her *Poa trivialis*, late peas and pansies. She prefers to let the sun in. She says "tell him the Tarryers were Welsh, that I was born three parts Scotch, and that this firm claims the right to criticise certain varieties of Scotchmen or any other race that works mischief in the garden. It's all in the family." Mrs. Tarryer adores the chivalrous and self-sacrificing Scottish character. She considers the way M'Alpine places his new system of "How to Know Grass by its Leaves," as a safe step for botanists to get to the ground, and the most heroic act since Raleigh flung his cloak in the mud for Queen Bess to travel on. "Now," she says, "if some Scotsman will hurry up the science of 'HOW TO KNOW GRASS BY ITS ROOTS, we may all be happy in our grass-gardens.'"



FLOWERS AS SOUVENIRS.

THE successful hostess has always some unique surprise for her guests. If this surprise, aside from being a "thing of beauty" be also a lasting joy, so much the better. The broadest field for ingenuity in this line is to be found in the designing of original souvenirs. These will be cherished, for they are mute reminders of the happy occasion. They are preserved with other mementos having fond associations.

Nothing appeals to the emotions with more eloquence than the speechless flowers. Their very silence arouses within the human breast the most tender, the most ennobling sentiments. They are treasured long after their beauty has deserted them; for their faded perfume breathes of a medley of recollections dear to the heart. They are appropriate at all times and for all persons, of all ages, and of all stations in life.

When gay flora is at its height, it is, of course, preferrable to use fresh flowers. In the midst of this splendid abundance think of the mantle of glistening white that will, ere many months, destroy and conceal all, and prepare for the flowerless inevitable! There are many kinds of flowers that may be perfectly pressed between layers of cotton, under a heavy book or books. The cotton absorbs all moisture and excludes the air, whereby the brilliant hues are retained. Even the delicate sweet-pea, treated in this manner, retains its splendor. Neither does the dainty forget-me-not then lose its dear, true blue. The daisy, lilac, bleeding-heart, even the rose—when not full blown—look very beautiful and natural when pressed in this way. Then there are flowers that, if picked before being fully developed, may be preserved by simply drying slowly in a dark, dry place. Such are the lily of the valley, golden-rod, bittersweet, hops and grain. All should have long stems, and are best plucked about mid-day, when they have least moisture. After being placed between the cotton, do not disturb them until certain that they are dry, after which carefully put them in a box between tissue paper.

Now, as to the use of pressed flowers in making souvenirs. With a narrow ribbon, tie a dainty bunch of flowers to the corners of a card, across the face of which is written its signification, as in the illustration. On the back of the card write some poetic description of the flower. The writing should be neatly done in black India ink, or if the maker be endowed with artistic skill, with metallic paints. Plain, beveled-edge regret cards answer nicely for this purpose. If a great number are to be made, it is best to have the printer cut a full sheet of heavy Bristol board into the desired size. For some flowers, of a branching nature, it is much more effective to have the card larger than the "regret" size.

When fresh flowers are obtainable, it is a charming fancy to slip them into an envelope. The stems being wrapped in moist cotton and tin foil, their freshness is easily retained if arranged during the afternoon. In such a design, the signification of the flower is written across the envelope; a verse on a tiny sheet of paper tucked into the corner, to which it may be tied with a "lover's knot." (See cut.)

The following are verses descriptive of some of the most common flowers, and of what they are symbolic:

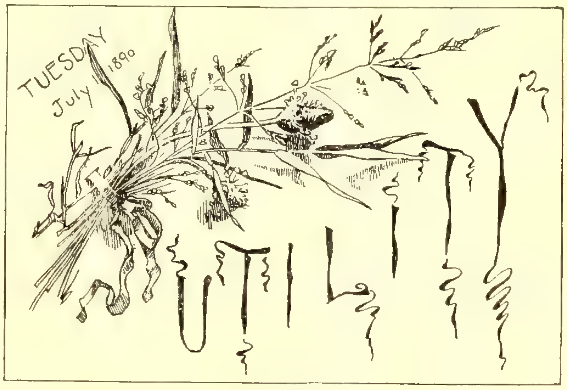
Red rose—"Love."
Moss rose—"Confession of Love."
White rosebud—"Girlhood."

"Just like love is the Rose:
Heavenly fragrance round it throws,
Yet tears its dewy leaves disclose,
And in the midst of briers it blows;
Just like love."

Grass is found beneath summer skies and winter snows. To see a graceful bunch of it tied with a green ribbon is indeed refreshing.

In grass we read—"Submission; Utility."

"Here I come creeping everywhere;
By the dusty roadside,
On the sunny hillside,
Close by the noisy brook,
In every shady nook,
I come creeping, creeping everywhere."



A CARD SOUVENIR.

"You cannot see me coming,
Nor hear my low, sweet humming;
For in the starry night,
And the glad morning light,
I come quietly creeping everywhere."

In spite of all that may be said to the contrary, human nature has a weakness for lucky four-leaved clovers.

Glue a bunch of three or five to the card, and write the words: "Health, Happiness, Prosperity." Or this:

> "When sitting in the grass we see
> A little four-leaved clover,
> 'Tis luck for you and luck for me,
> Or luck for any lover."

It is symbolic of "Good Fortune."

Pressed sweet peas, tied across a large card, are especially beautiful. Strange as it may seem, very few poets have sung its praises. The sweet pea expresses "Delicate Pleasures."

Those general favorites, the pansy and the violet, have been a source of inspiration for numberless effusions. In the face of the heart's ease, or pansy, we read, "Think of Me;" "Thoughts."

The violet is emblematic of "Modesty." As Burns says, "The violet is for modesty." However, Shakespeare says.

> "Violet is for faithfulness,
> Which in me shall abide;
> Hoping likewise that from your heart
> You will not let it slide."

A wealth of poetry celebrates the simple daisy. "Those white investments figure innocence."

> "Bright flower! whose home is everywhere,
> Bold in maternal Nature's care,
> And all the long years through the heir
> Of joy or sorrow;
> Methinks that there abides in thee
> Some concord with humanity,
> Given to no other flower I see
> The forest through!"

The forget-me-not, the flower of "friendship—kind as love, and strong as Hercules"—expresses its own sentiment.

The lily of the valley speaks of "the return of happiness."

> "Be thy advent the emblem of all I would crave."

> "No flower amid the garden fairer grows
> Than the sweet lily of the lowly vale,
> The queen of flowers."

Oats are symbolic of "Music," the charm and power of which Pope sets forth.

> "Music, the fiercest griefs can charm,
> And fate's severest rage disarm;
> Music can soften pain to ease,
> And make despair and madness please:
> Our joys below it can improve,
> And antedate the bliss above."

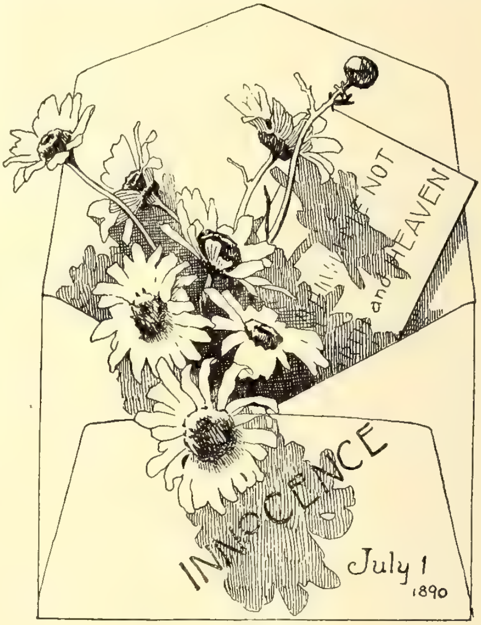
Bittersweet is typical of "Truth."

> "So every sweet with sorrow is tempered still,
> That maketh it be coveted the more:
> For easie things that may be got at will,
> Most sorts of men doe set but little store.
> Why then should I account of little pain,
> That endless pleasure shall unto me gain?"

The gleaming Golden Rod represents "Precaution."

> "Love, wounded daily, till it dies,
> The heart bereft that idly sighs,
> The loneliness, the sense of loss,
> Of treasures ruined, the human cross
> That every living soul must bear.
> What wonder that it seems so fair
> Beside man's weary world of sin,
> Thy world, that no sin enters in—
> O Kingdom of the Clovery sod!
> O peaceful realm of Golden-rod!

Poetry served as a "first course," is a sort of an "æsthetic salad," which is highly relished by all. It offers to each one a suggestive theme for bright conversation, at that critical juncture when, alas, so frequently, conversational powers desert us and consequently exchange of thought and words are stiff and awkward.



An Envelope Souvenir.

Should flowers, of any kind, be out of the question, substitute poetry descriptive of the season in which the entertainment is given. Or, per contra, make summer's heat seem less oppressive by pen pictures of the cold, dazzling splendor of winter; and let chill winter appear less desolate, with glowing pictures of a "A Rare Day in June," "Springtime, the only Happy Ringtime," etc. It is a capital plan to have a little scrap book for collecting pretty verses of sentiment and poems on the various seasons, sunset, dewy mornings, moonlight, etc.

Anna Hinrichs.

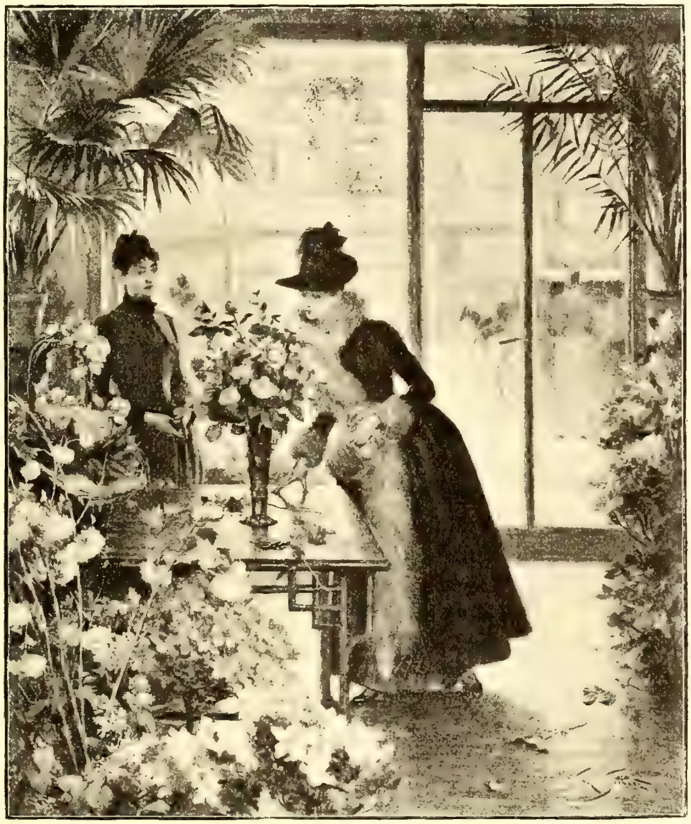
A NEW BUSINESS FOR WOMEN.

"Let us try," said Rose.

"We can do it," said Grace.

It was a beautiful room these girls were in. The side towards the street was glass, and a glass door led out to a small open veranda with steps to the side-walk. The house was on one of the fashionable streets of Detroit, and the lovely room so full of plants and flowers was the delight of the neighborhood. A large *Latania Borbonica* gave an aristocratic nod to a pteris in the opposite corner, and on the table was a vase of Jacqueminot roses. Even these lovely hued flowers could not make the girls smile, for they were brought face to face with the stern question, "What shall we do to earn our bread and butter?" Their father had died not very long before, and after his affairs were settled, a few hundred dollars and the house was all. "We must not sell our home," said Rose. "Papa was so happy while planning this room, and only last birthday he gave us that lovely palm," and she nodded at *Latania Borbonica*. "O! my lovely Jac.," said Grace bending over the flower, "Help us to keep our home, and to succeed in our new undertaking."

The girls had helped papa for years as he worked among his plants in his leisure hours. They were often invited to parties, always noticed the flowers, and trimmed their home with the most exquisite taste, when it was their turn to entertain. When papa died, Rose proposed that they boldly take up floral adornment for a living. A modest sign was put on the house near the glass door that led into the conservatory, "Flowers arranged for Weddings, Funerals, etc." A few more palms and ferns were bought as an investment. The room with its glass side was made bright with roses and rare flowers, and a brief announcement in the papers advised the public of the new enterprise. They made mention of the fact that they would make "designs," but their perfect taste made the designs quite different from the usual stiff monstrosities which nothing but the natural loveliness of the outraged flowers themselves render passable. Especially were their pretty arrangements for personal wear admired; indeed, the making of hand bouquets and breast knots became a very paying business. They did not grow the plants, deeming that too much of an undertaking, at the outset at least; favorable arrangements were made, and the flowers were bought at a discount from the large greenhouses in the city. The girls always remembered their first customer. The very morning after the sign was put out, a carriage stopped and a young woman clad in velvet and costly furs, came up to the glass door. Rose, with outward tranquility, but inward trembling, bowed to Miss Dora Morgan. "Will you come and arrange our table for the dinner party tomorrow? And there are plenty that will want you, besides, for I have heard several say that you sisters have more taste than professionals. You are plucky girls, and will succeed." And succeed they did. After a few months, there was hardly a wedding, funeral or dinner party in high society where these bright girls did not attend to the floral part. And the girls were happy in their work, too, and healthy—there was a wonderful difference between this varying, interesting occupation, calling out all the best thought, requiring deft hand work, and drudging in a school or store, with the meagre reward such labor brings. One day when they were filling a fifty-dollar order for a wedding, Rose said to Grace, "I wish other girls would try raising plants, or small fruits, or making floral designs. How much more healthy and happy they would be, if obliged to earn money, than in sewing or teaching! In few other branches of work that women can do has taste so much of a real money value."


THE FIRST ORDER.

"And yet with such boundless opportunities for taste and skill" said Grace, "so few women avail themselves of the chance for a pleasant and profitable livelihood. The floral magazines cannot do better work than to arouse in girls an interest in raising plants and flowers. In no other occupation can they take a more lively interest or more easily make a commercial and really artistic success." And so thinks

SISTER GRACIOUS.

The Editor's Outlook.

THEN AND NOW.

"As THE world progresses, new and more difficult problems present themselves, and a good working knowledge of nature's modes of action becomes more and more necessary. But no amount of knowledge will ever relieve mankind from the necessity of putting forth effort, which is the greatest factor of growth and development." "Mere physical energy counts for less and practical knowledge for more, now than at any other period of human existence."

You and I are witnessing a gigantic shifting of scenes in the great drama. We are seeing ignorance, prejudice and bigotry vanishing before education. We are seeing the old farms with their old methods, the old men with their old thoughts, pass away, while newness, thrift and energy come on. There are many of the older ways still among us, but they are now simply picturesque and serve to increase the interest in the shifting picture. The old farming will soon pass into history, and coming generations will wonder at it, as we now wonder at the monstrosities of the feudal ages.

Has it never seemed strange to you that men should ever have thought that ignorance is the safeguard of agriculture? And yet that day has only now passed into the twilight. Have you never wondered that men should think that men are the least part of any calling, that brawn and clay and tradition are more potent that brain? And yet some of those men are still among us. And do you wonder that the farm has not taken its place beside the forum, and that its brightest sons seek law and medicine and politics? Do you wonder that ambition and inspiration flee from bigotry? Farmers are fond of telling us that the farm supplies the intellect that moves the world, that it furnishes the cities with its sturdiest men. This is the saddest commentary that can be made upon farming. A calling that gives its best away, that retains the poorest for itself, can never thrive.

"A horse tied never so closely to a locked granary full of oats will be none the fatter unless his owner have skill enough to pick the lock." We are just now learning this simple lesson, and all the problems of coming ages will grow out of it. Nature has been a sealed book to the farmer, a locked granary. The very forces and conditions with which he has to deal have been hidden from him, and it is sad to think that he has tried to hide them from himself. He has repudiated the best thoughts of the best men in his contempt of "book farming." He has loitered by the wayside, and has then complained that others have out-travelled him.

But the reasons for all this are not difficult to find. They are to be sought largely in the condition of human society which has always placed a ban upon labor. They are to be sought, also, in the stifling of the search for truth, and in indifference to it, which, until the present times, in varying degrees, has characterized even the educated masses. We are only now breaking away from tradition into a freer light of investigation, inspiration and hope. And it is not strange that we have never known until now how ignorant we have been.

"But the end is not yet; energy in the soil and in the plant, never yet utilized, impatiently awaits discovery and the unfolding of the laws which govern it." Things grow old quickly in this human evolution. The best and most encouraging symptom of our farming is the fact that it is changing as rapidly as other things. The tools, practices, thoughts of yesterday are old to-day. To-morrow our best energies will be outdone. A century hence we will appear in our true perspective, in the first act of groping for the light. All our methods and machinery will have passed away, and heights which we cannot sight will have been left behind. But kindred progress will have taken place elsewhere. Even now the steam engine has passed its zenith.

Do you sigh that you could not have lived in coming centuries? Does the thought of the future make you faint-hearted? Does it lessen your appreciation of your own work? Do not make so fatal a mistake! This is a critical time. It is a crisis, and every man's best effort is needed. One's work is measured by his time, and no man's work in coming centuries can be more valuable than yours is now. Our agriculture needs talent, energy and persistence if it is rescued from its present condition. We are glad that we live in this daybreak of progress, that our blood bounds with the enthusiasm of discovery and anticipation. The wheels will move slower with the approach of noonday. With the greater perfection will come less energy. Ours is the richer inheritance. We have often wished that we might have lived in some of those great old times when the world took on new motives and started afresh. And yet we live in such a time. We need but to appreciate it!

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HORTICULTURE AT THE WORLD'S FAIR.

WE DESIRE to again call attention to the opportunity and necessity offered by the World's Columbian Exposition for a great congress of horticulture. We have repeatedly urged the importance of an International Horticultural Congress, and we have given what seem to us to be commanding reasons for its being. Trade organizations may aspire to make the horticultural features of the exposition little more than trade exhibits. And the general comments of the press and of horticultural societies seem to ask for little more than a mammoth show of fruits and flowers and vegetables.

We persist in the view that this great exhibition should afford the means of making a commanding study of the world's horticulture. Our country should receive untold blessing from it. All minor interests could be woven into this enormous fabric. All the competitions of states and regions should be encouraged, and all the horticultural trades should be fully represented. But some hand should systemize and combine all interests into one consummate effort to study the variations of plants under culture, the relations of plants to climate and all artificial conditions, and all the means and appliances by which man preserves and improves them and disposes of their products.

There is a manifest desire at the present time to introduce plants, especially fruits, from all possible regions, and the very existence of this ambition and curiosity would make an international fair particularly important and attractive. The Illinois Horticultural Society is taking the initiative in the movement, and has invited delegates from all horticultural societies to discuss the project in a meeting at Chicago. This meeting should present definite plans, and we watch its work with interest.

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THE TESTING OF VARIETIES.

WE DOUBT the expediency and the value of much of the testing of varieties at experiment stations. It is evident to anyone who has carefully observed the behavior of plants that variations in numberless conditions profoundly influence the character of horticultural varieties. Tests made ever so carefully at the station are often of little value for even adjacent regions. And even the same conditions of soil, culture and treatment often give dissimilar results in different years.

But it is not the inadequacy of variety tests which constitute their worst feature. As usually conducted, they are cheap and trivial in comparison with other work which may be done, and they belittle experimentation. The man who cannot see beyond the mere testing of varieties certainly lacks the mind and temper of an investigator. Such a man is simply a tester, not an experimenter. Merely testing varieties because they are put upon the market, like analyzing commercial fertilizers, is not true experiment. It is simply discussing what another has done, unmixing what another has mixed. It is investigation which follows rather than leads. The stations which lay most store upon this sort of work will every year find themselves where they were the year before. Their bulletins serve but an ephemeral use; they pass away as varieties pass away. They record no real progress.

There is plenty to be done. In fact, there is so much to do that all but the clear headed become confused if they catch any glimpse of the horizon. But we fear that many of our experimenters do not see beyond the garden fence, never get one inspiration from the white fields, ready for the harvest, which stretch away beyond all human ken. It is only now and then one looks from a hill-top. It is useless to attempt any catalogue of the things which need to be done. One who cannot discern them for himself will not be likely to profit by an enumeration of them. A man seldom rises beyond himself.

But varieties must be tested, they tell us. Yes; but make such tests a minor feature. Never let the impression get abroad that the stations are created for the purpose of watching scoundrels, or for doing work which must go down with the sun. It is said that the people demand it, but they do not demand that nothing else shall be done! And much of this demand, perhaps most of it, is but a reflex from the stations themselves.

The demand must be met, in a measure, however. The cheapest and best way to meet it is to cause varieties to be grown under commercial conditions by intelligent growers. Scatter them over the state and collect the reports. Or if the station cannot scatter the varieties, ask leading growers to report their experiences and the station can publish the results. Or let the horticulturist personally visit the representative growers, and write his own reports. In short, devise any method which shall broaden the observations, and at the same time leave the station freer to undertake better work. But we are decidedly of the opinion that the horticultural and agricultural press can do and are doing this work better than the stations. At the present time, commercial growers are usually better testers, safer judges, than are the experimenters.

It may be said, in opposition to all this, that only the stations can secure unintroduced varieties, and test them before they are disseminated. But tests of unintroduced sorts are as unsatisfactory as others, and practically they amount to little. An originator or introducer sends his novelties to many stations and proclaims the fact to the world as an evidence of his honesty. He is sure to get a favorable sentence or two from some station, and the more stations the more replies. He publishes the endorsements and forgets denouncements. The station may publish an adverse report, but comparatively few growers see it, and if they do they still want to try it upon their soil "to see what it will do." The fact is that tests made at only one place in each state, and upon from one to six plants, possess little value. And it is also true that the introducer usually puts his variety upon the market the next year or the second year after it has been sent to the stations. If we were an originator, we should avail ourselves at once of the "station dodge" as the best means of advertising.

Of course the experimenter must know varieties to a greater or less extent. A man must know his letters before he begins to read. But he is not called upon to pass an opinion upon every one, to give it a definite mark which he will probably want to modify with every crop. It is only in species which he is studying in a wider spirit, with some ulterior motive, that he need to know all the technique of varieties. The station should grow a general assortment of the most prominent fruits and vegetables, perhaps, for the benefit of those who visit the station, and to enable students to become familiar with them—for most of the stations are connected with colleges. And as often as the officer acquires definite information concerning any variety or set of varieties, let him send a note of it to the press. Or let some assistant or some specially competent student observe and compare the sorts and use the results where he pleases. The experimenter himself, if he is an *experimenter*, cannot afford to publish mere variety tests, unless they are a part of a more permanent investigation or of more general studies.

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NOMENCLATURE AND REFORM.

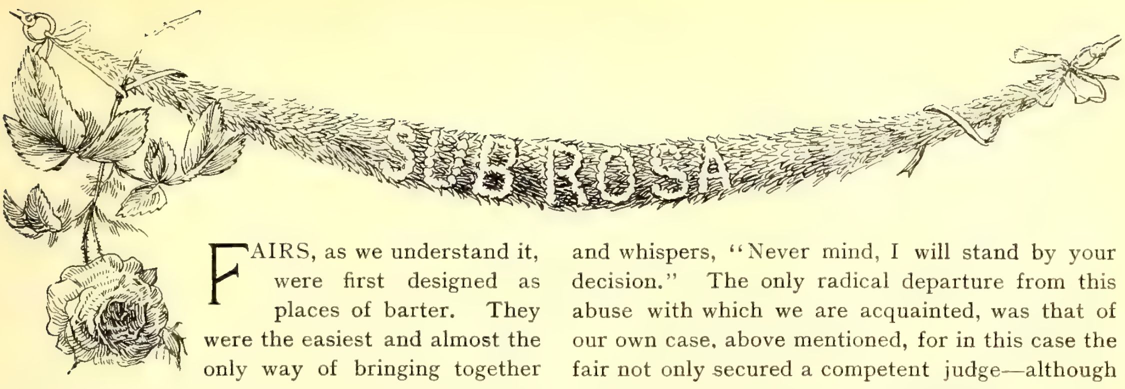
REFORM in nomenclature of varieties makes little progress. The blame for the trifling results is commonly laid at the door of committees or men having the matter in charge, but it is oftener chargeable to hostility on the part of the trades. To institute a reform in the names of varieties demands a strong sympathy for the movement among all dealers and introducers. It means that plantsmen desire to adhere rigidly to rules of priority, and that they abstain from the use of fustian, bombast and misrepresentation in the names they employ. Numbers of dealers are not desirous of taking this step; in fact they are hostile to it, although, from the nature of the case, their hostility assumes the outward form of indifference. Here is, undoubtedly, the reason why the trade organizations, cannot push the reform more vigorously. No better proof of this is needed than the fact that these attempts at reform usually originate with disinterested parties and are pushed to completion by organizations distinct from the trade societies.

We understand that there are difficulties in the way of correct nomenclature wholly aside from the indifference and opposition of those who, in the end, would be most benefitted by it. There are few among us yet who have sufficient knowledge of species and of plant variation to attempt a permanent reform. This is particularly true, perhaps, in ornamentals. Study can overcome these difficulties, however, but hostility must grow old and die.

But the foundations are laid. The work of the American Pomological Society is inspiring, notwithstanding the fact that few dealers and catalogues adopt it. The endeavors of this society have commanded attention largely because correct lists of names have been printed in the fruit catalogue, and so have been kept before the public. An actual list of names must attend all efforts of this character, for reform does not come from talking about it, nor from formulating bare rules.

The Society of American Florists is also making progress, although its work lies in synonymy rather than in nomenclature proper. But the moral effect of its labor, under its energetic chairman, must have a wholesome moral effect.

The most complete and sweeping reform ever attempted is in the names of garden vegetables, a movement which began and ended within a single year. The name of every vegetable known to be sold in the United States is passed upon, and the full revision is printed. The work attracts little attention now, but the time will come when that list will be appreciated. But we do not look for it soon; the trade must be purged before reform can thrive. When the catalogues have burned themselves up with their flaming colors, we shall hope to resurrect from their ashes a thing of greater substance.



SUB ROSA

FAIRS, as we understand it, were first designed as places of barter. They were the easiest and almost the only way of bringing together the producer and consumer. But things have changed, and mere trade is but one of many features of an agricultural fair. We fear that the fair has lost individuality in these modern days. It is little more than a conglomerate show without directness—except to make money for the management. It has been vaguely hinted—and some have even declared it aloud—that in this century the fair should be an educational institution, that its one paramount endeavor should be to instruct the farmer in best methods, best fruits, best stock and best tools.

But big pumpkins, big apples, big cabbages are not educational. When will our premium lists cease to offer bounty for bigness and grossness? Or when will judges learn that size does not mean "best?" We once—when we were fortunate enough to be a judge—pinned a blue card upon what we thought to be an extra fine lot of celery, whereupon a wild-eyed competitor demanded the reason, with the declaration that his celery was the biggest in the hall!

Why can we not have prizes for some such entries as these?—best collection of winter vegetables; best fruits or vegetables for clay or sandy lands; best collection of plums or peaches for distant markets; best collection of apples, with methods of handling, for exportation; best collection of flowers for fall ornamentation, and the like. Here is an endless opportunity to increase the attractiveness and value of a fair. Of course this means that judges must know their business, and this may be so strongly opposed to the policy of fairs as to render our suggestions worthless. It is a common thing to hear a judge remark, when complaint is made, that he knows nothing about fruits, for he is a tree-agent, or a stock farmer, or what not. Then why was he a judge? Judges appear to be minor considerations; they are picked up from the crowd at the last minute, and if one of them should protest that he knows nothing about "fruits and posies," the superintendent of the division jogs him knowingly and whispers, "Never mind, I will stand by your decision." The only radical departure from this abuse with which we are acquainted, was that of our own case, above mentioned, for in this case the fair not only secured a competent judge—although we did get a little mixed on the difference between a sweet pumpkin and a calabash—but he was notified two hours before the opening of the fair that he should serve, and he was given a complimentary ticket—admit *one*—for judging the fruits and vegetables and flowers, and with a request to look into the poultry department and to make a "good report" in the journal!

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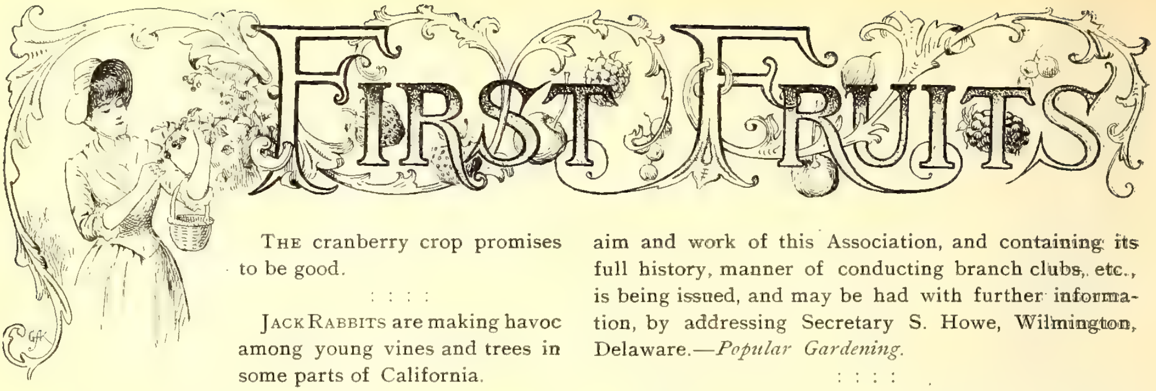
THE tree agents—poor souls!—have been much discussed of late. No end of unsavory epithets have been heaped upon them, and their ways of doing are said to be scandalous and libellous. And yet only yesterday one of them called upon us, and in answer to our query—ignorant clown!—declared that business is good, and never once intimated that farmers think him a guy! And his conversation gave us every assurance that in spite of all this fuss he will go right on selling his delicious impossibilities. And he sells them in the same region year after year. His sample-card of paints—known erstwhile as a plate-book—has long since become thumb-worn and old, yet the farmers over on the hills never tire of looking at it, and never cease buying. And the more impossible the fruits the faster they sell!

And whom shall we blame?—the tree agent for selling what the people want?—and thus snatch a yearly pleasure from the grain and stock farmers over on the range? No; we would not deny any bright anticipation to country life! If we are going to purge the tree agent, let us begin on his patrons. A while ago a correspondent, who signed himself an M. D., sent us two plum leaves and asked us to tell him what variety they were. "I bought the trees of an agent," he wrote "who said that they are a new and valuable sort called the Lombard. I paid $16 for two trees." By all means send more agents to that man! If we were not so busy in our sanctum just now—all the assistants have gadded off to the country—we should pack our kit and go ourselves.



FIRST FRUITS

THE cranberry crop promises to be good.

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JACK RABBITS are making havoc among young vines and trees in some parts of California.

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LATE in June early potatoes began to be shipped to eastern markets from California.

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CALIFORNIA horticulturists are making great preparation for the representation of the State at the World's Fair.

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WE SHALL have a heavy crop of apples, and some plums and cherries.—T. H. HOSKINS, M. D, *Northern Vermont, June 30.*

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IN SOME parts of California, particularly along the Santa Maria river, grasshoppers are reported as seriously injuring grapes.

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ORCHARD FRUIT crops in New York are very poor. Apples are almost a total failure, and the same may be said of peaches. Pears and quinces are a partial crop.

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CABBAGE growing is apparently one of the coming industries of southern California. A car load was recently shipped to the Mississippi valley from San Diego county.

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THE fifteenth anniversary meeting of the New Jersey Horticultural Society will be held at Rutgers college, New Brunswick, Monday, Sept. 22nd, Charter members are particularly solicited to attend.

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IN WESTERN MICHIGAN, the noted fruit region, apples will be a fair crop, pears and plums light, and peaches very light, except in Mason and Oceana counties in the northern portion of the peach belt. Small fruits are giving large crops.

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IN CALIFORNIA "there will be a good crop of peaches of fine quality; a fair crop of pears, but more or less damaged by blight and showing mold and rust. The crop of apricots throughout the state will be large, that of plums only medium, while as to prunes it is safe to calculate on about two-thirds of a crop."—*California Fruit Grower.*

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THE American Wild Flower Club intends to make a complete exhibition of native American flora at the World's Fair in 1892. A pamphlet descriptive of the aim and work of this Association, and containing its full history, manner of conducting branch clubs, etc., is being issued, and may be had with further information, by addressing Secretary S. Howe, Wilmington, Delaware.—*Popular Gardening.*

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IN SOUTHERN ILLINOIS, all tree fruits will give light crops, partly because of the depredations of insects. Blackberries and raspberries are giving very large crops. Strawberries were abundant—too abundant—and poor, and poor prices were obtained. Prices ranged, per crate of 24 quarts, from 25 cents for peddlers stock, to $2. The early season was very wet, and when picking came on it was hot, both together causing soft berries.

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AT THE May meeting of the Dutch Horticultural Society (Holland), first prizes were given for *Odontoglossum vexillarum*, *O. Cervantesii lilacina*, *Cattleya Schrœderiana*, and a collection of *Tulipa Billietiana*. Honorable mention were given *Vanda teres*, *V. tricolor formosa*, *Dendrobium mesochlorum*, *Cattleya Mossiæ*, collection of orchids containing *Cattleya Skinneri*, *C. Wallisii*, *Oncidium Kramerianum*, *O. concolor* and *Angræcum Ellisii*, collection of Narcissus, collection of early irises of 42 kinds, collection of Darwin-tulips, and *Lilium Thomsonianum*. Special mention was also made of *Vanda suavis* and *Primula veris*.

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THE CANADIAN TARIFF ON FRUITS.—The Canadian tariff of customs has been amended; the changes went into effect the end of March last. The duty on fruit has been considerably advanced, and is now as follows: Apples, 40 cents per barrel (formerly free); blackberries, gooseberries, raspberries, and strawberries, 3 cents per pound (formerly free); cherries and currants, 1 cent per quart; cranberries, plums, quinces, 30 cents per bushel; peaches, 1 cent per pound (formerly free); grapes, 1 cent per pound; dried apples, 2 cents per pound; other dried fruits, 1 cent per pound. On fruit trees and plants, as follows: Apple, 2 cents each; peach trees, 4 cents; pear trees, 4 cents; plum trees, 5 cents; cherry trees, 4 cents; quince trees, 3½ cents; seedling stock for grafting, 10 per cent.; grape vines costing 10 cents and less, 3 cents each; raspberry and blackberry bushes, 1 cent each; rose bushes, 5 cents each.—*Fruit Trade Journal.*

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HORTICULTURE IN UTAH.—The first bulletin of the new Utah Experiment Station, (E. S. Richman, horticulturist), gives the following information concerning the horticultural plans:

The Horticultural Department contains twelve acres. It will be fully covered with crops designated for investigation and for school room teaching. 1. It has set an important line of economic forest trees not grown in the Territory, for test in this climate. 2. It has growing seventy-five varieties of apple trees. 3. It has growing twenty-five varieties of pear trees. 4. It has growing twenty-five varieties of plum trees. 5. It has growing forty varieties of peach trees. 6. It has growing twenty-five varieties of cherries. 7. It has growing thirty vartieties of strawberries, eight of raspberries, eight of apricots, and various other fruits. 8. It has varieties of vegetables, including potatoes, under test. 9. It has in progress tillage and irrigation tests of crops falling within its sphere of work.

This department of the station work will be conducted fully in the interests which it represents.

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MILL CREEK POMOLOGICAL SOCIETY.—President H. T. Bigott read a paper upon "Theory and Practice," in which he said that so many of the ideas of professors and experimenters were mere theories, that they were of no use to practical men. We need more practical men in these positions, men who know what they are talking about. A unanimous vote of thanks was tendered Mr. Bigott, and it was ordered that his essay should be preserved in the archives of the society.

The question of insects and bugs was then taken up. Mr. Bigott found buckwheat and rye plowed under to be a sure preventive of the ravages of the codlin moth. A. J. Betterman thought that plowing under sowed corn was better, as it had less acid in it than buckwheat and did not sour the land so much. Mr. Bigott said that buckwheat was best because a gas was generated by the rotting of the flowers which is fatal to all bug life. In regard to the failure of the peach crop, M. T. Purverse said that the hot winds of the first of last November had dried up the sap, so that buds could not set. Mr. Bigott said that this could not be true, for it is well known that at that time of year the sap is all in the roots. O. C. Smith said that the failure in his orchard was due to a cold and dry wind from the northeast early in March which dried up the pollen and killed it in the bud. He had always noticed that a failure follows a dry northeast March wind. U. C. Weathers said that the wind Mr. Smith referred to blew from the southeast. These winds are always blighting in this section because they contain so much alkali from the marshes about the lake. Mr. Bigott was sure that the early spring winds were at the bottom of the mischief, but said that it was due to the drying up of the core or heart of the bud. Such buds would then produce leaves but no flowers.—ELVY SCRIBER, *Secretary*.

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FOREIGN FRUIT PROSPECTS.—During the last few weeks the weather has been so changeable that all kinds of fruits have suffered severely.

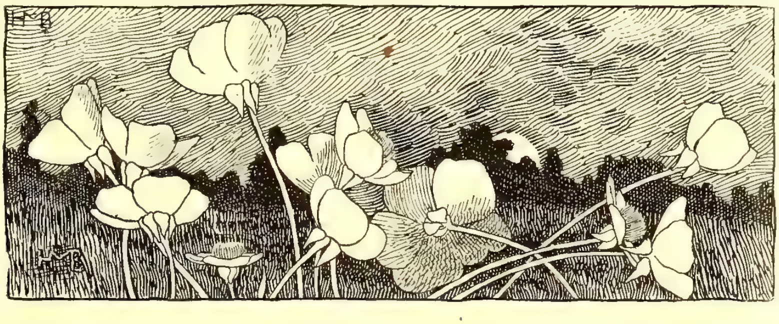
England.—Plums—The prospect is very bad; not one-tenth of a crop. Pears—Blossomed well, but neither early nor late varieties set properly. Black and red currants have been attacked by the "honeydew;" hardly one-half a crop is expected. Cherries—Early kinds were destroyed the second week in May. Since then the later sorts have suffered; the crop is reckoned as one-third. Strawberries and raspberries will be reduced one-half unless warm weather soon sets in. Gooseberries have been attacked by vermin and injured by frost, so about one-half a crop is expected. Apples—Those who washed their trees will save the bulk of the crop. Unwashed trees have been attacked by vermin and the crop will be very poor. Barely one-half a crop can be counted upon.

France.—The fruit crop has suffered on account of the cold wet weather. Early cherries have suffered severely. Apples in the south promise good crops. Plums and green gages half a crop. Black currants are only half a crop in the north. Pears are a fair crop.

Belgium.—Reports from several places speak of cherries from a quarter to one-third of a crop. Green gages and plums only a quarter crop. Early pears half a crop. Late pears a fair crop. Apples look well with every prospect of a fair crop.

Holland.—Gooseberries and currants are said to be a fair half crop. Cherries, one-third of a crop. Pears, one-third of a crop. Apples fairly good. Plums are a very small crop.

Germany.—The weather of May has affected the fruit in the Rhine districts, and it has also been attacked by vermin, so much so, that apples are now said to be a bad crop, cherries only half a crop, and plums a bad crop.—*Adapted from The Fruit Trade Journal.*



FOREIGN NOTES.

METALLIZATION OF FLOWERS.—Wash the flowers carefully, soak them some moments in a concentrated solution of gallic acid, then plunge them in distilled water, containing one fiftieth of its weight of azotate of silver. The gallic acid, with which the flowers are impregnated, reduces the silver salt. The silver retains its metallic luster and adheres firmly to the flower. The operation should be repeated until the flowers have a fine silver tint.—*La Nature.*

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AUTHORIZATION TO IMPORT FOREIGN VINES.—It is well-known that in our country regulations are carried so far that one is not even allowed to do what is best without permission. Here is another example of it; the district of Roch-sur-You has just been authorized, by a notice from the commissioner of agriculture, to import foreign vines, and vines coming from the districts in which the phylloxera exists.—*Revue Horticole.*

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CUCUMBER, BANNEUIL'S WHITE EXTRA LARGE, (*Blanc-très-gras de Bauneuil*). This has a very pronounced flavor which makes it much sought for in the market. The fruit is ovoid, and can easily be made to weigh 4½ lbs. It is pale yellow at first, but whitens as it matures. —*Revue Horticole.*

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CUCUMBER, GREEN, EXTRA-LONG OF CHINA (*C. vert trés-long de China*). The fruit is almost a foot long; the skin pale green, bearing a few spines, and marked by white longitudinal lines. Flesh very white. This variety is a steady and abundant producer.—*Revue Horticole.*

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THE LARGEST ORCHID KNOWN.—The plant was found growing on a Dario tree, at Félangas, Malaysia. After being detached it required fifteen men to carry it. This orchid is seven feet two inches in height, and thirteen feet six inches in diameter; it has seven clusters of flowers, the longest measuring eight feet six inches. The flowers are deep brown, spotted with yellow.—*M. de Keyser*, *in The Gardeners' Chronicle.*

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AUSTRALIAN PLANTS.—Baron Sir Ferdinand von Müller has issued a second systematic census of the plants of Australia, comprising their names, references to the books where they are described, date of publication, local and general distribution.—*The Gardeners' Chronicle.*

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EXPORTS FROM JAPAN.—The exportation of plants, trees and shrubs for the month of January, amounted to 5,708 yen. One yen is equal to 3 *s.* 6 *d.*—*Journal of Japanese Horticultural Society.*

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THE UTILITY OF BAMBOO.—Large quantities of Bamboo are at present brought to England as ballast. The large firm pieces are used in cabinet work, while the slender pieces are sold so cheaply that they are taking the place of the ordinary wooden supports for plants. Their hard silicious covering renders them much more durable, and they remain in the ground a very long time without decaying.—*Wiener Illustr. Gart. Zeitung.*

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TO DESTROY CATERPILLARS.—Mix two parts of chloride of lime with one part of lard. Mould this in the form of rolls, cover with cloth, and bind around the affected trees. The caterpillars will soon fall, and none will crawl up the trunk. Even butterflies will avoid trees treated in this manner.—*Garten-und Blumenzeitung.*

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MIRRORS AT FLORAL EXHIBITIONS.—At the Ghent exhibition of 1888, a large number of mirrors were used in the orchid department, and again in the same department at Berlin in 1890. In both cases the effect produced was wonderful. At Berlin the Throne hall appeared like a fairy land; for the spaces between the mirrors had been filled with palms, azaleas, and other ornamental and flowering plants, so that the hall looked much larger and more beautiful than on former occasions. Too many mirrors can hardly be used at such exhibitions.—*Gartenflora.*

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CAMELLIA ALBA PLENA.—Mr. Lathan, of Eddisburg, near Liverpool, has a specimen of this camellia which has grown to an enormous size. It is 19½ feet in height, the trunk measures 2½ feet in circumference, and the branches cover an area 20 feet in diameter. When in full bloom this tree is a wonder, and is annually visited by thousands of people. During the past year its fortunate possessor made over $250 from the sale of the flowers.—*Garten-und Blumenzeitung.*

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NOTES ON AGRICULTURAL EDUCATION.—Last year England gave £5,000, and again this year, to assist education and research, and this looks very trifling besides what other countries are doing. France in her budget for 1888-9 voted £163,600; Belgium, provides by the central government, £30,800, and by provincial governments, £20,300; Holland has a Department of Agriculture, but has recently voted funds for Agricultural institutions, and previously was spending £7,446 (of which over £1,800 was returned by produce) on forestry, dairy, and veterinary schools; Denmark, in the budget for 1889-90, provided for £56,680; in Germany the agricultural budget for the same years was over half a million, of which nearly £52,000 is for education and science, and over £40,000 for the veterinary department, while provincial administrations pay out £13,000, and are subsidized besides to about £6,648. There are also heavy subventions to institutions which are great aids to agriculture.—*The Horticultural Times.*

THEY SAY

This is an open department for the use of all interested observers, from whom correspondence is solicited on any topic of horticultural interest. Valuable items are frequently crowded out, but all will appear in due time.

The Hardy Satsuma.—In regard to the hardiness of the Satsuma orange tree, I can say it has stood the cold for the past six years on my grounds better than any other variety. The cold of 1886 did not kill it; the cold of last March only hurt a few trees that were full of sap. I have several hundred nursery trees grafted on sweet stocks that did not shed a leaf, although some of them were only a foot high. My experience is, it will stand Florida cold without damage, unless an untimely frost catches it full of sap.—F. TRUEBLOOD, *in Florida Dispatch.*

Native Plums.—The native plum is very promising. Some of the later acquisitions are of fine quality, with a quite tough skin. The markets here are well supplied with them in season, and they are of all shades of red and purple; some have a heavy bloom, while others are entirely free from it.—S. B. GREEN, *St. Anthony Park. Minn.*

Strawberries at Benton Harbor, Michigan.—The yield of strawberries in the vicinity of Benton Harbor is said to have been so large the past spring that hardly one-third of the crop could be disposed of at any price. The Crescent was the variety grown.

A New Apricot.—A seedling apricot which is entirely hardy and very productive is said to have been raised at Geneva, N. Y. The fruit ripens ten days earlier than the Early Golden. The variety known as the Harris apricot, and promises to have great value.

Importation of Date-Palms.—H. E. Van Deman, United States Pomologist, writes that he has recently imported some of the best named dates. Nine trees of the three best varieties were secured from Bishria in Algeria. These are rooted suckers and in fine condition. They came July 9th and are the first named kinds that have ever been landed on this continent. Shortly afterwards 54 more trees from Egypt arrived. There were 8 varieties in this lot and 6 male trees besides. We are on the sure road to have the date given a fair test in the United States and with the best kinds in existence. All now here are seedlings and of course inferior. This is particularly gratifying to us because Mr. Saunders, the Superintendent of Gardens and Grounds at Washington, has made the attempt twice in vain.

Lady Washington Grape.—We notice that Mr. Augur, in "Grape Notes" on (page 336, June issue) omits the Lady Washington. The behavior and merits of this variety have determined us to grow in the vineyard instead of in our experimental rows. On our ground it is a most emphatic success. It is a heavy, persistent bearer, a strong grower, and it has good foliage, which is very essential in this changeable climate. Although its blood is one quarter foreign it has no weakness in the vine, and the fruit is the better for it. It ripens with the Elvira, about one week later than the Concord. The bunches are large and well shouldered; the berries are persistent, medium in size, and when properly ripened, of a rich yellow color, like that of a good quality of honey. The skin is not tough but of such texture as prevents evaporation, hence I find the grape a good keeper. I laid some bunches in an open dish in my cellar and they kept better than the Niagara, being in good condition until Nov. 1st. They were picked Sept. 20th. I consider the flavor of this grape exquisite, and the consistency of the pulp is just right. We are more favorably impressed with this variety than with any other we are testing.—W. M. BOMBERGER, *Harlan, Ia.*

Apple Trees of Great Size.—In the July issue (p. 395) is given notice of several large apple trees, one of them "probably the largest apple tree in the United States, if not in the world." "The circumference of the trunk at the smallest place is twelve feet two inches."

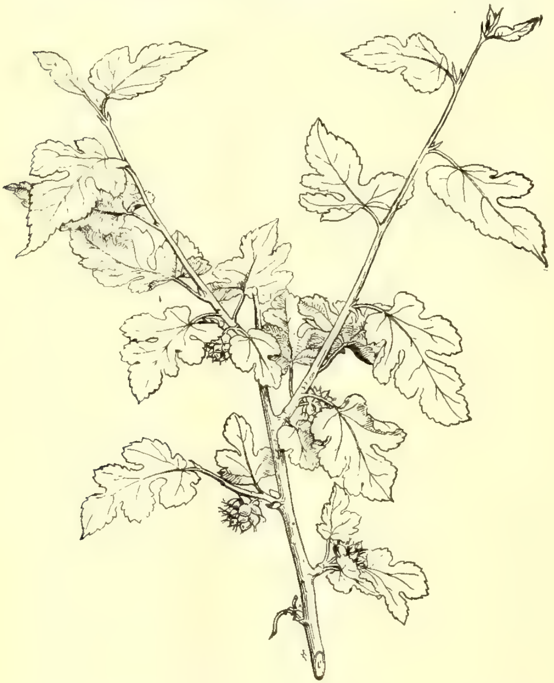
In the Report of the Connecticut Board of Agriculture for 1878 is an account of our Connecticut tree, by N. S. Platt, which is "thought to be the largest in the United States."

Mr. Platt writes in 1878, and as the tree is still vigorous, it must have grown enough to substantiate its claims, "an apple tree in the northwestern part of Cheshire, standing in Mr. Delos Hotchkiss' door-yard is thought to be the largest in the United States. Its age can be traced by a family tradition to one hundred and forty years at least, and it may be twenty or twenty-five years older. It is at the present time of symmetrical shape; the trunk is nearly round, without a scar or blemish on it; there are eight large branches; five of them, Mr Hotchkiss tells me, have been in the habit of bearing one year, and the remaining three the next.

He has gathered in one year from the five branches eighty-five bushels of fruit, and his predecessor had harvested a crop of one hundred and ten bushels from the same five branches. By careful measurement, I find the circumference of the trunk, one foot above the ground, above all enlargements of the roots, to be thirteen feet eight inches. The girth of the largest single limb is six feet eight inches. The height of the tree has been carefully measured and found to be sixty feet, and the spread of the branches as the apples fall, is one hundred feet, or six rods."

The fruit is rather small, sweet and of moderate excellence.—T. S. GOLD, *West Cornwall, Conn.*

Russian Mulberry.—How I boasted of my first 50 trees of Russian mulberry! They had just been offered to the public, and I was taken by those catalogue cuts which look for all the world like a brace of grubs for bait, and the execution of which always calls to my mind a school boy and a jack-knife. Not content with the first 50, I have now an extra lot. Many have borne for two or three years, and I have had a figure made to represent as good fruits as I have yet secured. It is said that these fruits are good for the birds, even if not respectable enough for human food, but I confess that I should look with distrust upon any bird which should eat my Russian mulberries in this land of plenty. If the reader looks close he will discover four fruits on this sprig. I had intended to insert a copy of the catalogue cut alongside this, labelling one "The Russian Mulberry as it Grows," and the other "The Russian Mulberry as it is Said to Grow;" but the trade cut is so abominably mean and crude and libellous that I could not bring myself to the point of using it. But they tell me that the Russian mulberry makes a good windbreak. This may be true, but for all I have yet seen I will take any rapid growing native tree in preference.—L. H. BAILEY.



RUSSIAN MULBERRY.

Strawberry Crates.—At a recent meeting of the Grand River Valley (Mich.) Horticultural Society the matter of strawberry crates was considered. The single tier of boxes was preferred. No matter how much caution is administered to employes, a serious lack of care seemed to compel growers to permanently adopt the single-tier, 12-box flat crate, box five inches square and two and a half inches deep. The fruit not only keeps better and carries better, but it shows off to much more advantage.

Hints to Berry Growers.—First. Post up on the work. Study your facilities, your land, capital, nearness to market, and ability to obtain needed help.

Secure the control of some good land. It costs as much to prepare and cultivate poor land as rich, and the profits are little or nothing.

Plant but few varieties, and only such as generally succeed. You can well afford to do without those new kinds that are "destined to supersede all others."

Be more practical than theoretical.

Be more ready to believe what you see than what you hear.

Take some good horticultural papers, and read them attentively.

Join a horticultural society, if there is one within your reach.

Do your work well. Both profit and satisfaction come from a little well done, rather than a large plantation grown in a slipshod manner.

Sell no poor berries. They will injure your credit more than they are worth. Use them, or give them to those who have none and cannot afford to buy.—*Ex.*

New Fruits for the South.—I have some very fine and rare fruits which were sent over by ex-Gov. Hubbard, of Texas, while Minister at Japan, viz.: Three varieties of pears, all apple-shaped, better than Leconte and Kieffer, and beginning to bear at two years of age. The plum: "Bougoume" ripens the 10th of May here—the very earliest of plums, very large, golden yellow. I also have a cherry from Japan, not fruited yet, which I expect will bear, and do well here.—J. L. NORMAND, *La.*

The Michel Strawberry is much praised in the Southwest. L. M. Pyles, of Arkansas, writes of it as follows in the *Fruit-Growers' Journal*:

I have just returned from the State Horticultural Fair, where I met a great many berry growers from different parts of the State, and it has been the universal experience of all the growers that they would have made no money out of the berry crop this year, except the few who had the Michel berry, and they all say—"If it had not been for the Michel, I would have been left on my berry crop this year." They ripened about four days later than last year, and, though they bloomed all winter, produced a good crop, and went into market at paying prices until the advent of the berries farther north about May the 20th, and now, the 26th, finds them full of ripe fruit and white with bloom after being in bearing since April 18th, when the first crate was shipped from here.

A few words of instruction concerning this berry are necessary: 1st, if you have set them less than four feet apart, take up every other one and prepare more ground and reset; 2d, keep the runners off till late in the season; 3d, don't let them mat and get thick in the rows. If you do, you will have a good crop of early fruit.

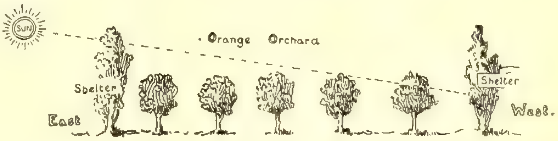
Apple Instructions.—Plant your apple trees on the highest and dryest land you have that will produce a fair crop of corn. Prune to one central trunk with side branches eight inches apart. When you plant the trees, set two inches deeper than they stood in the nursery; mulch for three feet all about the tree, and shade the body of the tree, both fruit and shade trees, up to the limbs, to keep out the borer and keep off the sun. Use marsh hay, lath, bits of fence boards or brown building paper; this shading is very important in the west. If you must replace a tree in the orchard where an old one has died, remove a wagon load of earth and replace it with fresh new soil.—GEORGE J. KELLOGG, *Wisconsin.*

Varieties of Native Plums.—The varieties of native plums are promising, especially the offspring of *Prunus Americana* in the northwest.—H. E. VAN DEMAN, *before Nurserymen's Association.*

The Fruit Garden.—Do not plant small fruit in your orchard. Have an acre and fence it from the chickens; have long rows, and plant everything wide enough to cultivate with the sulky cultivator. Every family needs for each member of the family one bushel of currants and gooseberries, two bushels of strawberries, one bushel of raspberries, one bushel of blackberries, fifty pounds of grapes, and two barrels of apples, each and every year. This will give health, happiness and a love for the old home. You can grow as many strawberries on a square rod of ground as you can of potatoes. Set the plants in long rows early in the spring. Strawberry plants should not be set on ground where water will stand in winter. Set the plants even with the surface—not too low, nor the crown above ground. Firm the roots of everything, and use a little water in planting. Get plants that are true to name—the pistillate plants are the best bearers, but an acre of them would be worthless for fruit. They outrun all others, so don't go to the old bed for plants, you may get all pistillates. If you plant two rows side by side of one variety, you can depend upon the plants between those rows as pure, and you may thus keep them by planting a few rows each year.

That garden acre should have on the north or west side, a row of grapes eight feet from the fence, and eight feet apart; then eight feet a row of currants, gooseberries and pie-plant three feet apart, a row of blackberries, a row of red raspberries, a row of black raspberries; then your strawberry ground where, after it gets grassy, you can plow it up. Your ground should be rich enough to produce one hundred bushels of corn to the acre, for all kinds of small fruit.—GEORGE J. KELLOGG, *Wisconsin.*

Windbreaks for Oranges.—I have been much interested in the bulletin on windbreaks from the Cornell Experiment Station. I have given a good deal of attention to the sheltering of orchards by belts of timber, and have found that they protect from winds and ordinary late and early frosts. At Rivers our orange groves are subject from October to March to so-called "northers," a wind blowing from due north and usually for three days and nights continuously. When orchards are not protected from these winds, the injury some seasons amounts to fully 75 per cent. of the whole crop. Have found also that when the shelter belt was planted on all sides, and that on the east side was tall enough to shelter the orchard from the first rays of the morning sun, the injury from frost was only perceptible in the branches first exposed, while in orchards without the shelter on the east side, the damage was quite marked throughout the orchard. The following diagram will illustrate my meaning and experience:



A. orchard trees not injured by frost. B. tree top nipped by frost. The *Eucalyptus globulus* (Blue Gum), *Schinus Molli* (so-called Pepper Tree) and the Monterey Cypress, are all used for shelter belts, the last named is the best.—H. J. RUDISILL, *Los Angeles, California.*

[NOTE.—This is another instance of the old and ever new experience that frosted plants suffer less when kept in the shade. The trees and branches first struck by the sun suffered most. This is a kind of protection from shelter-belts which had never before occurred to us.—ED.]

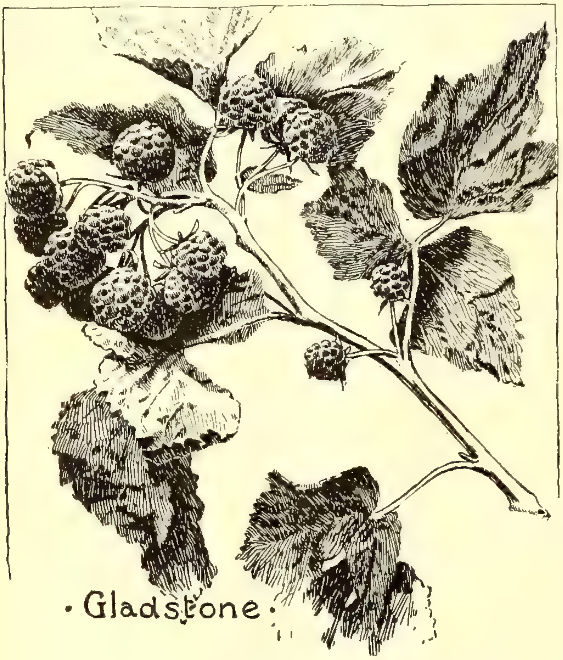
Strawberries in Cold Storage.—An Oswego, N. Y., paper speaks as follows concerning J. Heagerty's cold storage, a description of which appeared in our July issue (p. 396):

"The value of cold storage is illustrated by the strawberries in Mr. Heagerty's store, which were put into his cooler six days ago. Take a box, shake them up, and examine carefully; not a mouldy berry will be seen. Apparently they are in as good condition as when first put in. The tendency is towards drying up, not decaying."

Trials of "New and Rare" Seeds.—We return our heartiest thanks to the Department of Agriculture for eight (8) packets of White ruta baga seeds and (2) of Red-top Strap-leaf turnip seeds. We note the instruction to "please report results" and shall be glad to comply with it. We have rented a bit of land for the purpose of giving these novelties an honest trial. Uncle Samuel will always find us ready to aid in the advancement of horticulture.

United States Agricultural Appropriations.—The total sum given from the public funds for the support of agricultural experiment stations for the year 1890 is $725,000. This is about equivalent to a tax of 1¼ cents per capita on the population of the United States.

The New Red Raspberry, Gladstone.—The Gladstone raspberry originated with the veteran and well-known horticulturist Charles Carpenter of Kelleys Island, Ohio. He sent us plants to test four years ago. They were given no particular culture, and almost forgotton, until fruiting time, when passing that way I was attracted by a buzzing of bees. Looking towards the source of the music of the busy insects I noticed the plants of Gladstone, the strong canes bowed down with their burden of ripe fruit, and yet blossoming freely, the blossoms being covered with honey bees.



The points that struck me most forcibly about this new raspberry were: 1st, perpetual fruiting, beginning July 15, and continuing through August, September and October, after other raspberries have disappeared; 2nd, bearing full crops the same season planted, the fruit appearing on the canes of the present year's growth, as well as on the canes of the past season's growth; 3rd, the great vigor and hardiness of the plant, the canes growing often 5 to 6 feet high, and the foliage never scalding; 4th, the quality of the fruit, which is far above the average of red raspberry; 5th, the productiveness of the plants—I have seen no variety of this class that will produce so many berries. The color is a dark red, a little too dark for best display. The size, while not the largest, is above the average red raspberry as seen in our markets. It is propagated from the root, like most of the other red varieties.—CHARLES A. GREEN, *Rochester, New York.*

Mr. Carpenter writes as follows concerning it: "It is a chance seedling that came up in my garden some 10 or 12 years ago where I had a number of kinds, among them the Catawissa. I think it a very good berry for family use. It may not be so desirable for market, as it matures its crop gradually during the whole season so that there is never a very large picking at any one time, I think it is better to cut the canes close to the ground every spring; by doing this you do not get any fruit in spring, but a better fall crop which lasts from about August until frost."

Pears East and West.—D. B. Wier, in the *Petaluma* (California), *Courier*, calls attention to Mr. Powell's pear notes in the June AMERICAN GARDEN, (p. 331), and says that California growers cannot make the pear more profitable than Mr. Powell does. Our Pacific friends are behind in the use of arsenical and copper sprays. This is largely because they have not needed to use them, but they must introduce them soon or suffer. Mr. Wier declares eastern pears are "better in quality than it is possible for us to grow here. We can only beat them in beauty and size, and possibly not even these, when all of the enemies to the east are imported here."

Tomatoes in 115 Days.—Professor Massey doubts (July issue, p. 434) the possibility of any one being able to fruit the tomato within 115 days from seed, and states that he has yet to see the tomato that will yield ripe fruit in less than four months; but it is certain the thing can be done in this latitude in much less time and without the aid of glass or any other protection.

At the experiment station here 48 varieties were sown in open ground on March 28th. Every variety germinated in less than a week, but the plants were not moved until April 28, when they were set out in their fruiting quarters. The first ripe fruits were gathered from Little Gem, a small-fruited variety, on June 19. This was 84 days after sowing the seed, and 53 days from the time of transplanting. On June 24th ripe tomatoes were gathered from every variety, and this was 88 days after sowing the seed. Dwarf Champion grows only moderately here, but the fruit is of fair size. Prelude is about two days earlier than Dwarf Champion. The fruit is smaller than the latter, but otherwise much similar.—H. W. SMITH, *Baton Rouge, La.*

To Tell Ripe Melons.—In my young days I was laughed at so much for pulling green melons (for I could not decide when ripe by thumping) that I put my wits to work to decide in some other way; and after experimenting for years I at last learned to tell very easily, and will give the results of my experiments for the benefit of any who may ever be in a like dilemma. My plan is this: I draw my thumbnail over the melon, scraping off the thin green skin. If the edges of the skin on each side of the scar are left ragged or granulated, and the rind under the scar is smooth, firm and white, and has something of a glassy appearance, the melon is ripe. But if the edges of the scar are smooth and even, and the thumbnail has dug into the rind in places, and the skin does not come off clean, then the melon is green. You can easily learn on two melons, one ripe and the other green (after they have been cut open), and noting the difference.—*Ex.*

Contribution to the Etymology of the Word "Apricot."—The derivation of "apricot" from "praecox" which you say (AMERICAN GARDEN, May 1888, p. 208) is the accepted explanation, but not satisfactory to you, seems to me not only rather far fetched but etymologically incorrect.

To make this plain, one has only to look at the names of the fruit in modern languages. We have in English "Apricot," in German "Apricose" and in French "Apricot." These are evidently derived from the same source. My purpose is to show that the Latin had nothing to do with the English name of the fruit. Of the three languages mentioned above, French is unquestionably nearest to Latin, English next and German furthest from it. It would then follow that the word passed from Latin into French and in the passage underwent an important change, changing p into b; this, too, in a prefix very common in French (Latin "*prae*," French "*pre*"). This looks suspicious, especially when one considers how very particular the French are about distinguishing b and p. But the next step is still more incredible. While French, the careful daughter of Latin, failed to get the correct word from her mother, German, the careless alien, gets the pure article, notwithstanding the general indifference shown by most Germans as to distinctions between b and p, d and t, etc. This seems to me absurd. Again "in those early times, say a couple of thousand years ago," when the apricot is supposed to have been called "Praecox" by the Romans, these same Romans had a military post called Turicum in Helvetia. To-day in the same place (Zurich, Switzerland) the fruit is grown and known as "barilla" (I give it as near as I can as it is sounded, for the dialect spoken there is not written).

Now if the fruit was known among the Romans at that time "praecox" why did the inhabitants not adopt the same name? Why and where did they get "barilla?" Since the fruit did not originate there, but was probably introduced by the Romans, it would seem that the people would naturally adopt the name with the fruit. The only reason I can give for the use by the natives of that neighborhood of a name so very different from those used by their neighbors, is that the Romans did not call the fruit "praecox," but something similar to "barilla," as evidenced by the Spanish name "albericogne," from which take the Arabic article "al" and we have the root of the word "beri," which is much like "bari" the root of the Swiss dialect word. Very likely the Romans had received the name with the fruit from armenia and it would no doubt be interesting to trace it in that language, or, that failing, I would suggest ancient Irish for a clue to what the Romans really did call it. At any rate, I am not aware that anyone has proved conclusively that they called it "praecox." It seems to me the word "apricot" admits of a much simpler explanation. I believe it to be French and derived from the contraction of the French words "abie" *a sheltered place* and "cote," *a side* of a house, or "cote" *a slope or hillside*. Upon a sheltered side of a house or a sheltered hillside, the fruit is usually grown in the central latitudes of Europe. The German and English names I consider merely corruptions of the French original.—F. J. MULLER, *Birmingham, Alabama*.

The Goumi.—We have lately had specimens of this novel fruit from Messrs. H. H. Berger & Co., of San Francisco. We find the pretty little red, gold-flecked berries pleasant eating, and we see no reason why the plant should not become a pleasant addition to our gardens. It is closely allied to the buffet-berry of our west, being a member of the genus elæagnus (*E. pungens.* Messrs. Berger wrote as follows concerning it: "We do not know whether this berry-bearing shrub is generally known in the United States, but it is certainly of great merit, bearing when quite young, and in profuse quantity. The fruit is eaten in Japan raw, or pickled

THE GOUMI.

or in the usual way of preserves in sugar. Either way it is a most palatable and healthful fruit. Owing to its character of deciduousness, it would no doubt prove hardy in the eastern states. When fully ripe, it loses the acrid taste it possesses when half ripe, and acquires a pleasant aromatic flavor. We have made jelly of a small portion of fruit, and it is far more pleasant than even currant jelly. The bushes grow very rapidly and adapt themselves to almost any soil. The foliage, with its silvery underside, is very ornamental. Altogether, especially owing to hardiness and other qualities, it ought to be widely known and recommended."

A Chance for the "Novelty" Makers.—Professor Bailey recently showed the writer a curious instance of the peculiarities of grafting. A tomato vine had been grafted on a potato stalk. The tomato vine was bearing fruit and probably the potato plant will develop tubers. What a great chance here for some of our benevolent plant sellers! Let them advertise a "wonderful discovery," and tell people how to grow tomatoes and potatoes on the same plant without fear of bugs or blight. Thousands of people would pay well for the "great secret." Do you not believe it?—*Rural New-Yorker.*

Inspiration.

I walked to-day in my garden.
The sweet peas and phlox so bright
Had lifted their heads in gladness,
And turned to the welcome light.

The rain drops had fallen gently
In the evening the day before,
And the morning had dawned so clearly
We surely could ask no more.

All nature seemed sounding the praises
Of the generous Giver above
Who had set the whole world singing
Because of his bountiful love.

And I thought as I gazed on the beauties
Of the landscape about me spread,
The blue hills in the distance,
And the bluer sky o'er head,

That I, a poor erring mortal,
Should try to be worthy the love
And the blessings and beauties bestowed
By the Bountiful Giver above.

—MARY GARFIELD.

A Pernicious Weed in Manitoba.—I send you a specimen of a dreadful weed, which we think was introduced in seed grain a few years ago. There seems to be no way of getting rid of it. It is called here "stink weed," I suppose from its disagreeable odor when pulled, or "French weed," much to the disgust of the French people, who call it "laviolette." Each plant produces immense numbers of seeds and it grows two crops in a season. People have tried leaving the field fallow for several years and have then several times had to plow up the green crop on account of the weed. It is all through the French half-breed settlements, and in some cases it has taken entire possession of the farms. —A. L. G., *Otterburne, Manitoba.*

[The weed is the field penny-cress, one of the mustard tribe, which has great circular pods almost as large as a penny. It is known to botanists as *Thlaspi arvenoe.* We have never known it to be a serious pest before. It is a European weed which is sparingly naturalized in many parts of the country. It is an annual, and it would therefore seem that close and persistent culture, with a good rotation of crops, ought to hold it in check. —ED.]

Sturtivant's Tobacco and Sulphur Fertilizer.—Experience with this fertilizer the past season has given me a very favorable impression of it, though the results of a single trial of any such article do not offer conclusive proof of its value. Two adjoining patches of tomatoes were put out on the same day on land infested with cut-worms. A handful of the tobacco was placed around the stem of each plant in one patch. The other was not treated. Fully three-fourths of the latter were cut down within twenty-four hours. Of those treated with the tobacco and sulphur only one plant was lost.

I also tried it, in a small way, in the hills when planting potatoes, and the product was entirely free from scab.

The effect, as a fertilizer in both cases, was also noticeable, though the quantity used was small. Mr. Calder, the Boylston street, Boston, florist, has tried it this season with satisfactory results. His potatoes have been infested with scab for several years. This year not a sign of it was found. A friend in the Connecticut valley has used the tobacco fertilizer in quantity the past two seasons and is convinced that it will prevent scab, as well as repay its cost as a fertilizer.

My father writes me from Vermont, that owing to the excessive rain of the present season his trial is not a fair basis for an opinion, but that he is favorably impressed with the article and will use it another season. At the first opportunity I shall use it when setting strawberries, with the hope of checking the ravages of the white grub.

The stems and refuse leaves are both used, I should judge, in manufacturing the fertilizer.—W. H. RAND, *Boston.*

"Gard'nin'."

Theyse a heap uv fun in gard'nin', in the fresh air spendin' hours,
Breathin' freedom, health an' sunshine, tradin' life with leaves an' flowers.

Course it aint all violets, roses, honey, yieldin' every bud—
Nur the du-drop does it sparkle, always wher you wish it would.

Oft' the seed you sow so tender, fails to lift its tiny head;
An' the canker sometimes pisons th' only peach a turnin red.

Fur the gard'ner they'se a heap uv jes sich luck to "grin an' bear."
Still the sunshine in the garden out-weighs all the shadders there.

Indiana. ERNEST WALKER.

Pennsylvania Road Suggestions.—The Pennsylvania State Board of Agriculture, in session at Bethlehem recently, spent one day discussing the matter of getting better roads, and finally voted suggestions for road legislation as follows:

First. Privilege of working out road taxes to be repealed.

Second. Supervisors to employ labor where best value can be obtained, preference to be given to home labor.

Third. That all commodities of equal value shall be taxed at the same rate as real estate.

Fourth. That some efficient head in each county shall be appointed to prepare plans and supervise the work of road building.

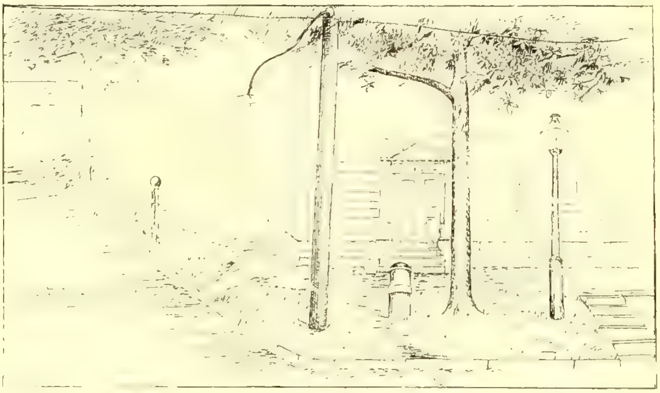
A Budding Machine.—W. H. Rowell, of Ft. Meade, has invented a budding machine. Mr. Rowell's budder being "loaded" with a bud, plows under the bark, a pull on the trigger drives the bud in, and it is left in proper position for binding. Mr. Rowell claims that 12,000 buds can be inserted in a day with his budder, and that a child can learn the use of it in fifteen minutes. This implement is in some respects like a seed dropper. The part that holds and inserts the bud is made of different sizes or numbers, adapted to the different sizes of buds and stocks. By changing the points it may be used on stocks ranging from an inch down to one-eighth of an inch in diameter.—*Florida Agriculturist.*

Farmers' Institutes.—Secretary Rusk speaks with enthusiasm concerning farmers' institutes: "I would merely say on this subject that it is a matter of no little gratification to me that this great work has nowhere been more fully tried than in my own state, where it was my privilege and pleasure to encourage it in every legitimate way, and nowhere has it reaped a more abundant harvest than in Wisconsin. Experience there and in other states has fully demonstrated the extraordinary benefits arising from these institutes, and I am strongly of the opinion that, without going into details as to the precise way in which aid to the movement should be furnished, the National Government, in pursuance of the policy so strongly marked out by the establishment of the agricultural colleges and experiment stations, should put it in the power of the Department of Agriculture to foster and encourage the work of the institutes in the various states and territories. The institutes have been justly designated the farmers' colleges. No truer title was ever conferred. I will only add that the strongest lever to raise and uphold the work of superior agricultural education represented by our system of agricultural colleges and experiment stations is to be found in this institute and kindred work."

The Cactuses that bear the most flowers and give greatest satisfaction in this northern latitude, are not those entrusted to the care of florists and to the climate of a hot-house. Here they grow best in a dry, cool room, which has an even temperature during the winter, and which allows the entrance of sunlight and heat during the early spring.

This season we travelled on the banks of the Hudson, and along the Atlantic seaboard from New Jersey to Massachusetts, and the most splendid specimens of cereus, both crimson and pink, of the rat-tail and crab-claw cactuses, and such free-blooming sorts that we saw, were grown by flower-loving women, possessing only the simplest appliances for the work.—D. W.

Spoils Rural Beauty.—One of our artists was in an ambitious rural town not long ago, and his attention was directed to a scene which suggested the accompanying sketch. It is a warning to "keep rural and not ape city ways." The good people who are so fortunate as to own and inhabit the handsome old house, built somewhat in the square colonial style, are fond of gardening and kindred things. The house was somewhat badly placed at first, being directly on the street, as was the custom when it was built. There is a large garden on the other side of it, not shown in the sketch. With commendable public spirit, a high board fence that concealed this beautiful garden was taken down and the latter is now a daily delight to the passing towns people. The owner's ambition was to have a green grassy bank around the house, but this apparently simple thing has been attended with difficulties. First, the town had a hole dug and a lamp post put up. Then a water hydrant made another blemish. Thinking that this property held its share of public institutions the owner requested that the electric light post be put elsewhere, yet he had to submit. The hitching post is a country institution and a great convenience to the neighbors who have none, but the horses are inclined to gnaw and trample the bank. Steps were provided for the people who want to cross the street, but most of them prefer to walk on the grass, and have worn paths by so doing. Somehow these people are not yet satisfied; they feel as if they were not in a city, and yet have lost the simplicity of a country town.



Some Cactus History.—Dr. George Engelman wrote in 1856 as follows concerning the knowledge of American cactus: "The only cactus known to Linnæus from the countries north of Mexico was his "*Cactus Opuntia*" (*Opuntia vulgaris*). Long after him, more than forty years ago, Nuttall, the pioneer of west American botany, discovered two mamillarias and two opuntias on the upper Missouri, and again, twenty years later, in California, a new echinocactus. About ten years ago we became acquainted with numerous new cactaceæ in

Texas through Mr. F. Lindheimer; in New Mexico, through Dr. A. Wislizenus, and in northern Mexico through the same explorer and Dr. J. Gregg; some others (and among them the giant of cactuses) were indicated in the Gila country by the then Lieutenant W. H. Emory. Soon afterwards Mr. A. Fendler collected several new species about Santa Fé. Mrs. Charles Wright, a few years later (1849), discovered in western Texas and southern New Mexico, still other undescribed cactuses.

"But the greatest addition to our knowledge of the cactaceæ of the northern part of the United States was made by the gentlemen connected with the United States and Mexican Boundary Commission, at first under Coloner Graham, and subsequently under Major Emory. Science is indebted principally to Dr. C. C. Parry, Mr. Charles Wright, Dr. J. M. Bigelow, Mr. George Thurber and Mr. A. Schott, for valuable collections of living, as well as dried specimens, and for full notes taken on the spot. About the same time, M. A. Trécul, of France, and after him Dr. H. Paselger, of Prussia, traversed southern Texas and northern Mexico, collecting many cactaceæ, and increasing our knowledge of this interesting branch of botanical science.

"The Pacific railroad expeditions since 1853 have opened fields not before explored, and Dr. Bigelow, the botanist and physician of Captain A. W. Whipple's expedition along the thirty-fifth parallel, availed himself of these opportunities in a most successful manner; while Dr. F. V. Hayden, almost unaided in his adventurous expedition, has extended our knowledge of the northernmost cactaceæ in the regions of the upper Missouri and Yellowstone rivers.

"The last, but by no means least addition, was made in 1854 and 1855, by Mr. Arthur Schott, during the exploration under Major Emory of the country south of the Gila river, known as the Gadsden Purchase."

Confusion Confounded.—One or two things that came up at the nurserymen's convention form such an excellent commentary upon some of the matter in The American Garden for June, that "I made a note of them" for you. In that number Julius R-*h*-owbotham's valiant warfare on the botanies was funny, and no doubt many of your readers agreed with him. But at the late convention, during a discussion about forest-tree planting, the "black locust" was several times mentioned by western men. A gentleman from the east (Mr. Hull, of N. Y., I believe) asked if by this the honey locust was meant. One gentleman said "no," very emphatically; another said "yes," taking the words from the other's mouth; half a dozen explained the whole thing, while the one who had just asked the question looked blanker every moment. It took about ten minutes of the valuable time of the association to elucidate the fact that the "three-thorned acacia" and the "honey-locust" are the same, and that the "black locust" is entirely different. In the meanwhile, Mr. Fernow, the national superintendent of the forestry division, labored, without much apparent success, to instil into the minds of all present that if they should call the honey-locust by its botanical name of *gleditschia*, there would be no confusion. The matter ended with a hearty laugh, caused by one of the western men replying to an easterner's question, as to whether he would get black locust if he sent to them for honey locust, that if he sent to a western man he would get *just what he sent for!*—C. S. Valentine.

Education and Journalism.—In connection with J. H. McF.'s assertion that the "way to educate the dear people against being humbugged is through an honest horticultural publication" (June issue, p. 377), place this fact: In a national convention which the promoters had striven to make the best that had ever been held, and when special effort had been made to have the best speakers in the country to deliver addresses on the most live, and most practical topics, very little was brought out that had not already appeared, in various forms, in our best agricultural and horticultural publications. The convention was a grand educator; the matter was brought together in systematic form, which cannot always be done in our journals. What better exposition could we have of the value of these periodicals?—C. S. Valentine.

The Mamillarias.—It would be very difficult to find any plants in the whole vegetable kingdom which present such beautiful examples of symmetry as the mamillarias, and in their own family they are also unique in this respect, for though many of the grotesque opuntias, cereuses and echinocactuses possess larger and more brilliant flowers, and they are surpassed in horticultural value by the phyllocactuses and epiphyllums, yet for delicacy of design they are unrivalled. A large number of them resemble exquisite pieces of mechanism finished with the greatest minuteness and accuracy. Others, again, might be imagined to have undergone a kind of crystallization, their whole surface being frosted over with star-like spiculæ arranged with geometrical precision; and still others appear as if covered with the finest gossamer.

Culture.—Many of the mamillarias are found in limestone districts, and though inhabiting varying climates and elevations, they may be all grown in an intermediate temperature, such as a greenhouse, where they can be protected from frosts during the winter, but a higher temperature is needed during the spring and early summer when growth is advancing. A free exposure to light and sun is requisite at all times. The soil should consist of two-thirds sandy loam and one-third finely broken bricks and lime rubbish. The pots must be well drained, and water should always be carefully supplied, but much injury is often done by keeping the plants too dry. They should be examined at least once a week, even in the winter, and if the temperature is above 50° and the weather bright they may be safely watered. These plants may be advantageously grown in a glass case, as this protection keeps the dust from their beautiful spines.

Propagation.—The majority of the tufted and branching species can be readily increased, either by the offsets from the base, or by removing the side branchlets. The former only need potting like ordinary plants, keeping them rather dry until growth commences. The branchlets can be laid upon dry soil until some roots show at the base, and they can then be treated similarly. The more delicate sorts, or those that produce few offsets, can be grafted on any of the cereuses, to which they readily unite; and this has a double advantage, for while the plants often grow more strongly, they are also less liable to decay, as such forms will do unless very great care is exercised in supplying water. *Cereus tortuosus* and others of slender habit may be chosen for the small-growing species.—*Lewis Castle.*

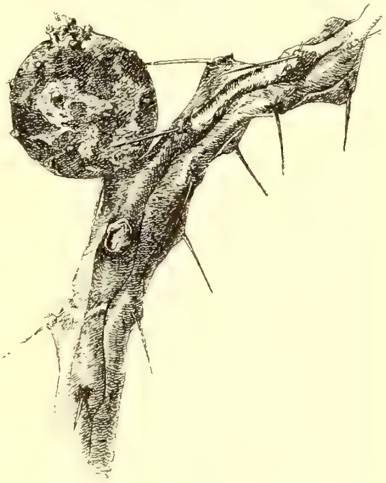
The Old Man Cactus.—The "old man" cactus is one of the curiosities of plant life. *Cereus* or *Pilocereus senilis*, derives both its botanical and popular names from the large number of long silvery white hairs which cover the upper portion of its stem, and impart a peculiar resemblance to the hoary head of an aged man. These hairs are really soft weak spines, which attain the length of several inches, and instead of spreading regularly, or projecting rigidly, as in other members of the family, they are flaccid and pendulous, thickly clothing the stem. It is necessary to protect this plant from dust if it be desired to preserve its beauty, for it has a very disreputable and unwholesome appearance when what should be silvery white hairs become dingy and stained. It is, therefore, preferably grown in a small glass case, where with a few other select cactuses it will be seen to excellent advantage. Though *C. senilis* is one of the best known species in small collections, yet large plants are seldom seen, and probably the finest in England is that grown at the Oxford Botanic Garden. This is sixteen feet high, of proportionate diameter, and has been in cultivation at least a hundred years, having been originally imported by the Duke of Bedford, and transferred at the dispersal of the unique Woburn collection to Oxford. Even this height is said to be exceeded in its native home of Mexico, where specimens have been described as reaching the height of twenty feet. One character common in varying degrees to all the cactuses, but very strongly developed in the "old man" cactuses, is the large quantity of calcium oxalate secreted in the cells of the stem. To such a degree are these crystals formed, that old stems, when cut, lose the succulent portion of their structure but still preserve their form, becoming almost like petrified stems, solid, heavy and stone-like.—*Lewis Castle.*

Musa Sumatrana.—Allow me to call your attention to a mistake in your musa nomenclature (page 332, June issue). I think, if you were served at breakfast with fried fruits of *M. Sumatrana* instead of the *M. paradisiaca*, the plantain of Pisang, you would soon conclude there was not only a distinction, but a difference as well.

The fruit of *Musa Sumatrana* is a woody pod filled with small black seeds that are as hard as shot, and it belongs to that section of the musa that are grown as decorative plants only. As we are advertising *M. Sumatrana*, we don't want people to buy it with the impression they are getting plantains, or *vice versa*.—R. D. HOYT, *Bay View, Fla.*

[The article in question did not say that *Musa Sumatrana* is an edible plantain, but only "a cultivated plantain in the West Indies." But we are glad of Mr. Hoyt's remarks concerning the true nature of the species.—ED.]

Cactus Fruit.—Few people know the interest and beauty which is often attached to fruits of indoor plants.



The fruits of cactuses are particularly interesting. We append a cut of a berry of *Cereus Martinii* which one of our subscribers has sent us.

Across Lots.—Why is it that some fruits respond so liberally to the efforts of horticulturists, while others defy every advance, preferring seemingly to be simply wild? We have just been through one of nature's own gardens, where fruits and flowers vie with each other in beautiful profusion. There were huckleberries of seven different kinds, some better than others, but all good; low sugar berries, dangle berries, great juicy swamp berries and a few of the rare white huckleberries. We have made repeated attempts to cultivate and improve on these, but always the same result, dwindling away gradually or dying at once. How different it is with the blackberries, of which there are in the same place four kinds in fruit, two of which we could not eat at all, and the other two were not unlike the luscious, well-ripened Lawton or Kittatinny of our gardens. These examples serve to show how much we have learned and also how much there is to learn.

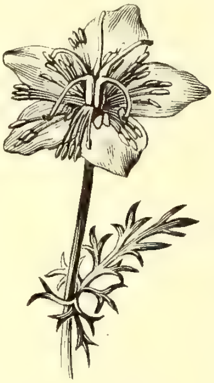
Our national flower, the golden rod, is bearing us a marvelous wealth of gold, and among the forty odd species in this section of our domain, we can have it in all degrees of perfection. In the *Solidago bicolor*, one would think it was silver instead of gold, but then there is the eighteen-carat *Solidago odora*, smiling like a double eagle, to supply the deficiency. Which of them is our national flower?

Nothing can look more barren at this season than the wild heath (*Hudsonia ericoides*). Here are acres of it apparently dead, as if scorched by fire, but if you could come next May, you would see a sight never to be forgotten. It will be one grand flower-bed of clear yellow, by which all our cultivated plants look shabby and poor.

Did you ever go out for a walk and count the different wild flowers in bloom? If not, try it once, and see what an extra interest it will excite in even an ordinary walk. Still better, it will be to make a list of the different plants, not merely the showy and beautiful ones, but include the humble and unpretending ones also. You will find many that are new to you, and perhaps you will not know their names, and, too, you may find several which you thought alike to be very different on closer observation. You will note these differences in your mind and soon will know each plant you meet. If you have a text book of botany, it will help you. Many a delightful afternoon may be spent in the fields, book in hand, learning nature's secrets. With a little practice with your book, you can find the names of most of the plants you meet, but let me say right here, do not take it for granted that the common name you know a plant by will always be the one given in your text book, as common names are in many cases only local in their use.—F. L. BASSETT, *New Jersey*.

Color Variation in Primulas.—Having very choice varieties of Chinese primroses, we concluded, last winter, to try an experiment on the variation of color. Two varieties were chosen for our purpose, one being the new porcelain blue, and the other a white-flowering variety with red stripes and blotches. We crossed the striped variety with pollen from the blue, thinking to produce a sort having the national colors—red, white and blue—in the same flower. From the seed produced by this crossing, we succeeded in growing about a hundred plants. In all stages of growth, the foliage and general appearance of the plants were identical with those of the blue-flowering variety, but when in bloom, not one flower was produced which had a speck of blue in it. About one dozen plants in the entire lot bore striped flowers—red on a white ground. The others produced flowers of a beautiful china rose with a very faint reflection of blue, forming a variety wholly unlike any which we previously had. The improvement in the size of bloom, and the low, robust habit of foliage is decidedly marked, and shows clearly that the influence of the pollen from the blue had materially affected the seed of the striped variety. The plants were, to all appearance, likely to produce blue flowers, but it turned out that not one did so, and, except that the flowers have but a mere noticeable reflection of blue, they do not at all resemble those of the blue variety, though the foliage is decidedly similar. We shall continue our experiments by crossing the blue upon these new striped and rose-colored varieties, and we may eventually develop a more prominent influence of all the blue in the bloom as well as in the foliage.—JOHN F. RUPP, *Shiremanstown, Pa.*

Some Good Old-Fashioned Plants.—I agree with Conference Corner for May about the *Nigella Damascena*, or "love-in-a-mist," also called "ragged lady." But in connection with it, I would notice *Nigella sativa*, "garden spice." There was always a bed of this in my grandmother's garden, and the seeds were used for flavoring apple pies, and in my boyhood's memory gave a flavor not surpassed by any of the spices of the tropics. It is now rarely found in the lists of the seedsmen, as it is less showy than the *N. Damascena*.

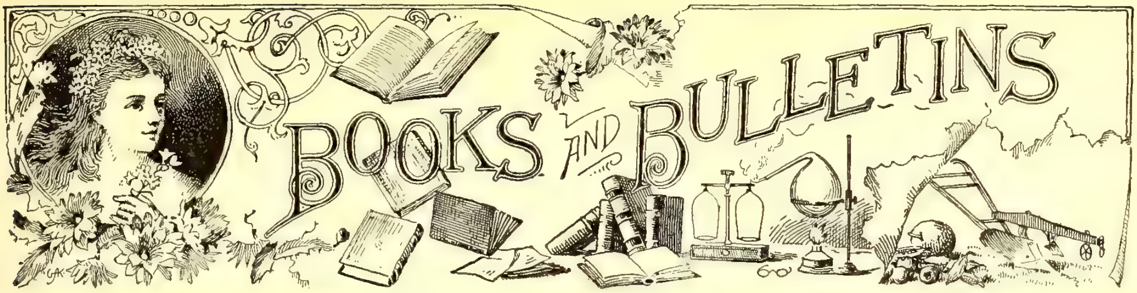

NIGELLA SATIVA.

Don, in his greenhouse dictionary, calls it "Cultivated Fennell Flower," to distinguish it from many species growing wild in southern Europe. He says: "Formerly, the seeds of *N. sativa* were much in use as a carminative stimulant and nervine, but this medicine has become deservedly obsolete. They are still used in some parts of Germany and Asia in cookery instead of spice, being a pleasant aromatic. Said to be used extensively in the adulteration of pepper." The cost of the seeds and the peculiar flavor would interfere with this last use, but it is worthy of being restored among the sweet herbs in every garden.

Adonis autumnalis—"Flos Adonis," "Peasant's Eye," "Soldiers-in-Green"—is another old-fashioned flower worthy of retention. It thrives with common care and is very hardy. It blooms in autumn, and continues to blossom till the ground freezes. Its blood-red flowers, surrounded with its finely cut leaves, is very striking in its effects when all other flowers but, perchance, a stray pansy, are faded. Pressed in the leaves of a book, it makes the prettiest souvenir in the whole floral kingdom.

There was also a dwarf rose, called "button rose," or "Burgundy rose," half hardy, that we have not seen in many years, that we would like to see again in every quarter.—T. S. GOLD, *Cream Hill, Conn.*

What Makes the Difference?—A splendid bush of the Mrs. John Laing rose, which has been filling the house with pleasant odor from its many blossoms, is standing in the window. This rose is only of recent introduction, but is surely winning its way to the hearts of the rose growers, although no great stir has been made over it, as was done when the now almost worthless Majesty was brought out. For two seasons, both in the greenhouse and out of doors, the former has proved for me a most gratifying success, while the latter, under like conditions for three years, has proved almost an unmitigated failure in everything, except that it makes a fair growth. Why two roses so much alike, and from the same English source, should so greatly differ in worth, seems to me a problem worthy of serious consideration.—E. E. SUMMEY, *Niagara Co., N. Y.*



Timber Book.

TIMBERS AND HOW TO KNOW THEM. *By Dr. Robert Hartig, translated by William Somerville. Edinburgh: David Douglas. Pp. 83. Illustrated.* This neat little hand-book affords the means for the identification of timbers from characters of the wood itself. The illustrations represent sections of wood magnified five times, or as they would appear under an ordinary pocket lens, and upon the features thus brought out, in connection with more obvious characters, the classifications and determinations are made. This method, although seemingly somewhat arbitrary, nevertheless brings natural groups together. It is just such a little hand-book as we need in this country. The book will serve the American student a useful purpose, although comparatively few of the species described are common to America.

Tree Planting in Brooklyn.

THE TREE PLANTING AND FOUNTAIN SOCIETY OF BROOKLYN [N. Y.]. *Pp. 44.* "In the spring of 1882 a number of citizens of Brooklyn, interested in having the streets of the city beautified with shade trees, met * * to consider 'the most practical method of establishing a regular system of shade-tree planting on the avenues and streets of our city, thereby adding to its attractions as a place of residence, the pleasure, comfort and health of the people.'" "Meetings were held, circulars issued, and articles calling the attention of citizens to the importance of tree culture were published in the daily papers. Nurserymen were communicated with to learn the varieties of trees in stock, and prices at which they could be obtained. At the approach of spring, the society secured a store and kept specimen trees from various nurseries on exhibition, and suitable persons in attendance to wait upon people calling, and to give all information desired relating to the planting of trees, varieties, and places where they could be obtained at rates most favorable. When desired, the society furnished trees at cost price, and, when requested to do so, sent men to plant them, charging for such service only the amount paid for labor." Great success has crowned these efforts, and the society secured the passage of the law creating arbor day in New York. The pamphlet gives several legal enactments concerning tree planting, and instructions as to what, when and how to plant. A report is also made upon the scale insect which attacks shade trees.

Studies of Plum Curculio.

BULLETIN NO. 9, IOWA EXPERIMENT STATION. Part IV of this bulletin records the work of C. P. Gillette upon spraying for the plum curculio and plum gouger. Observations were made to determine how late the curculio continues to lay its eggs, and it was found that eggs were deposited in plums certainly until August 22. These eggs were laid by belated females; there is no evidence to show that the insect is double brooded. It was found that the curculio has a decided preference for the old varieties of plums, as compared with the native varieties. The fruit of *Prunus Simoni* was not attacked. The curculio seems to like the Oldenburg apple, and the eggs laid in the apples are just as sure to hatch as those laid in plums, notwithstanding a common notion to the contrary. The puncture of the curculio upon the apple is not often crescent-shaped, but is "only a broad puncture or slit running obliquely into the flesh of the fruit. Such punctures as these are not very uncommon on plums." The Wier theory that curculio larvæ do not develop in the native plums is not true. "Those who have studied this subject most thoroughly and carefully know no curculio-proof plums." The idea that the most succulent and quickest growing plums are least liable to curculio injury, because the growth of the fruit is supposed to compress and kill the eggs and larvæ, is not only untrue, but just the opposite is the fact.

The Plum Gouger.

The plum gouger, an insect rarely if ever found east of Lake Michigan, is often more serious than the curculio. It appeared last year fully a week before the trees were in bloom. The puncture of this beetle appears as a little black speck. This insect shows a decided preference for the native varieties. "The plums infested by the gouger do not, so far as my observations have gone, ripen or fall prematurely, and all stung fruit that falls before the 20th of June will not mature the perfect insect. So, gathering the fruit as it falls will be of no account as a remedy. There is one remedy, aside from jarring and collecting the beetles, that seems to me to be a very practical one, and that is to gather and destroy all stung fruit as soon as possible after July 1, and before August 10. This might seem, at first thought, to be too laborious a task, but it should be remembered that if all the trees in a district could be once thoroughly gone over with in this manner it would mean practical extermination of the gougers in that localities for years, for at this time every gouger in the country is imprisoned in the plums. London purple is of little avail in fighting this insect.

BULLETIN NO. 10, MISSOURI EXPERIMENT STATION. *Analyses of Apples at Various Stages of Growth. Bordeaux Mixture for Grape Rot. Comparative Tests of Small*

Fruits and Potatoes. By John W. Clark. Pp. 16. Professor Clark caused chemical analyses of Ben Davis apples to be made at different seasons, in order to determine if chemical composition can afford any reasons for the thinning of the fruits. A sample was taken July 9, one October 23 of large and perfect fruit, and another at the same date comprising small and imperfect specimens. The results show "that a large proportion of the mineral matter contained in the fruit is stored up during the early part of its growth," showing "the importance of thinning fruit as soon as it is of sufficient size to show the wormy and imperfect specimens." A surprising result of the investigation is the fact that the late sample of small and imperfect fruit shows a richer content of plant food than the large and perfect specimens; and from this apparent anomaly, the author concludes that "it costs less to grow a barrel of large and perfect apples than it does to grow a barrel of small and inferior fruits."

Composition of Apples.

Bordeaux mixture proved a satisfactory remedy for grape-rot, when applied three times.

Of strawberries, "the ten most profitable varieties fruited on the station grounds were: Crescent, Haverland, Captain Jack, Miner's Prolific, Bubach No. 5, May King, Cumberland, Triumph, Crawford and Gandy."

"Of the black-cap raspberries the most profitable were the Acme, Palmer, Hopkins, Gregg and Hilborn. Of the red varieties, the Cuthbert, Turner and Palmer were the most productive."

Among blackberries, "the most profitable variety is Early Harvest, on account of its early ripening, the whole crop being disposed of before the other varieties were ready to market, and also before the wild blackberries were ripe. The two varieties that ranked next were Kittatinny and Agawam. It may be well to state that the lowest point the mercury reached during the winter was seven degrees below zero."

Blackberries in Missouri.

BULLETIN NO. 9, TEXAS EXPERIMENT STATION. *Pear Stocks, and Some Parasitic Fungi of Texas. By T. L. Brunk and H. S. Jennings. Pp. 29. Illustrated.* Professor Brunk has undertaken an investigation to show what influence the stock may have upon certain varieties of pears. He has undertaken to show the behavior of the European or French pear stock as compared with trees grown upon their own roots, or practically from cuttings. He has also investigated the desirability of using apple stocks for pears. He has confined his attention chiefly to the Le Conte and Keiffer. Concerning the behavior of these pears upon the French and apple stock, he draws the following conclusions: (1) Wherever the stocks are set deep enough, the roots invariably start out from the cion, and the number and strength of these roots is proportionate to the amount of scion below ground. "This tendency to make its own roots and discard the French stock, and to grow thriftily when the point of graft is set below the surface of the soil, has led some to the erroneous belief that the Le Conte grows as well on the French stock as on its own roots. It is no sign or proof that a tree is growing upon a particular stock because it is grafted upon it." (2) Whenever the stock was set so high that the scion could not throw out roots, the stock outgrew the scion in every case, forming an ugly enlargement, which indicates a point of weakness. Peculiar excrescenses are also thrown out from the top of the stock. These are abnormal growths, composed of both bark and wood, and are often as large as a hen's egg. They are often found upon Le Conte and Keiffer pears grown upon French stocks. (3) Trees forced to grow upon the French stock alone were found to be less vigorous in their growth than those upon their own roots. There are also indications that these varieties are more precocious when growing upon the French stock than otherwise, but they bear less, and are shorter lived. "The Le Conte and Keiffer grafted upon the French stock wil not live more than about seven years, if forced to grow on that stock. In all of my correspondence, only three recommended the use of the French stock for the Le Conte and Keiffer pears, while many, without solicitation upon my part, stated that they believed the Le Conte to be the best stock for European pears." Professor Brunk finds that when the scion is set deep enough to allow roots to form, the French or apple stock is thrown off after a few years and becomes useless. It therefore serves only as a mother to nourish the cutting for a time. He does not discourage the use of the French or apple stock if a long scion is used and it is deeply set; but to force trees to grow upon these stocks alone is certainly bad practice. It is better still to grow Le Conte and Keiffer pears from cuttings whenever practicable. Apple stocks are not so good as pear stocks, because they sucker more, although they may be used to advantage because of their cheapness, upon soil where Le Conte and Keiffer do not root easily. A number of replies from different parts of the south, to questions concerning the propagation of pears, are given in the bulletin. The larger part of them favor the growing of the Le Conte and Keiffer upon their own roots.

Stocks for Le Conte and Keiffer Pears.

H. S. Jennings, assistant in horticulture and botany, gives a considerable list, with notes, of the parasitic fungi of Texas.

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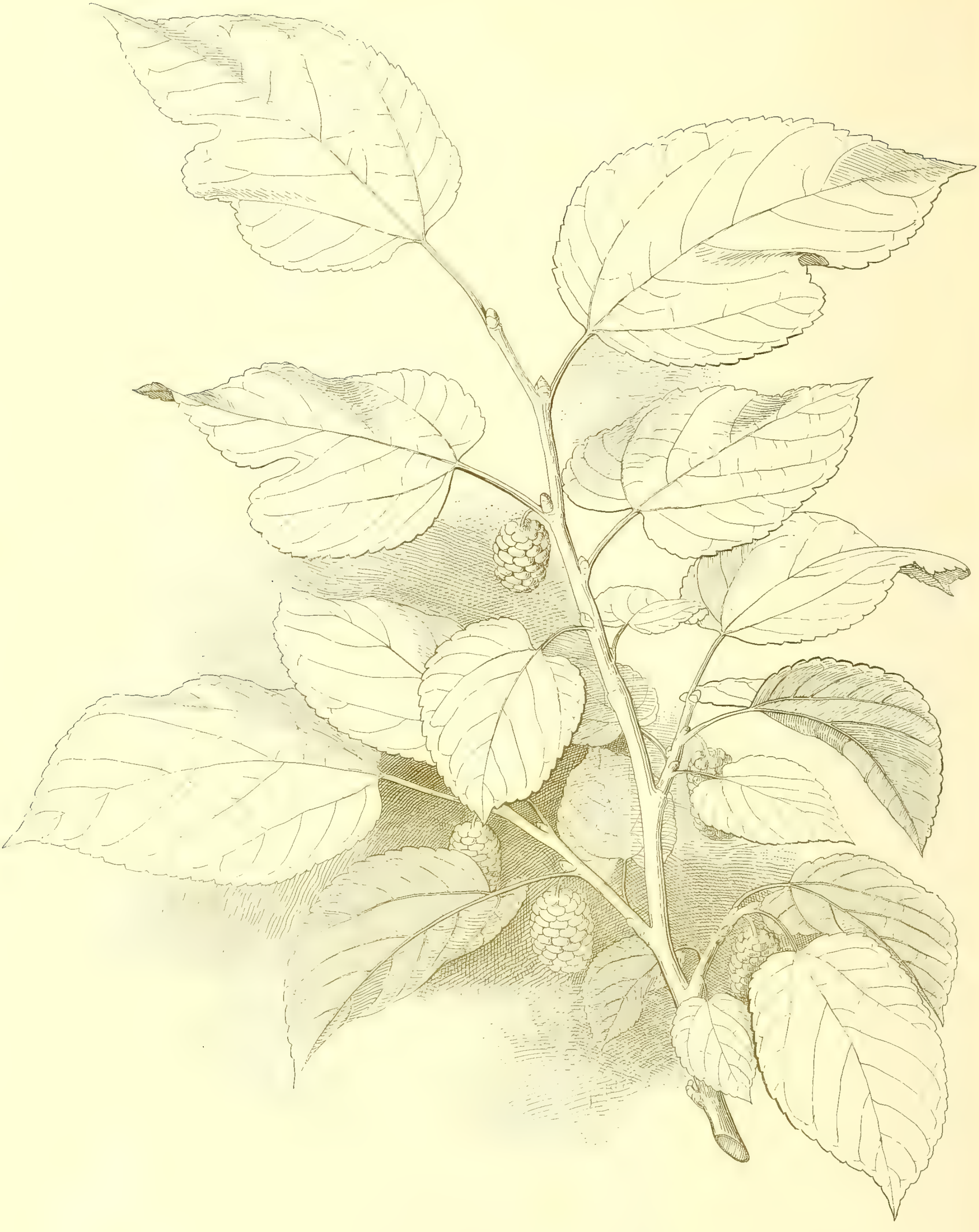

THE NEW AMERICAN MULBERRY.

The American Garden.

VOL. XI. OCTOBER, 1890. NO. 10.

NEW FIELDS.

THE PAST AND THE FUTURE IN THE WORLD OF FUNGI.

THERE are comparatively few people who are aware that we have constantly around and about us a host of almost invisible plants that play as important a part in the economy of nature as the grasses of the field, the trees of the forest or any of the numerous forms of plant life seen in every-day walks. Botanists have named, grouped and classified these plants just as they have the more highly organized kinds. One of these groups comprises the fungi, a heterogeneous class, which includes the toad-stools, mushrooms, rusts, mildews and blights. The man who studies the fungi is now-a-days known as a mycologist. The science of economic mycology is yet in its infancy, and I may be pardoned for saying a few words in regard to the nature of the investigations a mycologist is supposed to make. Strictly speaking, an economic mycologist is one who investigates the diseases of plants caused by fungi, but as a rule the field of such an investigator is broader than this, covering a great many plant diseases not due to the foregoing cause. For this reason, I think the term "vegetable pathologist" a more appropriate one, as it does not limit the field. Of course there is a limitation to this term, for if carried too far, we shall encroach upon the ground of the entomologist and others who have to deal with the diseases of plants caused by animal parasites.

The fungi are for the most part so small that the highest powers of the microscope are necessary to see and study them. Many live upon dead or decaying matter, hence they may be regarded as of direct benefit to man, breaking up complex chemical compounds, and in many other ways aiding him both directly and indirectly. Aside from the fungi that live upon dead matter, there is an exceedingly large class that attacks both living animals and plants, and it is with these, especially those attacking plants, that the economic mycologist has to deal. Every plant that the farmer, gardener and fruit grower cultivates is subject to the attacks of one or more of these parasitic foes. The grape alone has more than fifty of these pests, and it is a wonder that we are able to grow this choice fruit at all! More than two hundred and fifty species live upon the apple, and it is very probable that fully one-third of these are positively injurious.

To a limited degree, some of these forms are beneficial to the farmer, because they attack and frequently destroy noxious weeds. There is no doubt that many of our most troublesome weeds are held in check by this means, so that there is really a promising field here for investigation.

As we have seen that the fungi are true plants, the question may arise as to how they grow and by what means they are able to produce diseases. In the first place, it should be remembered that the fungi with which we are concerned have not the power of getting their food from the air and soil, as is the case with the higher form of plant life; consequently they must depend on other sources for it, the main one being our cultivated crops. These are attacked and their food appropriated, the results being sickness and death. The parasitic fungi, then, are nothing more nor less than robbers, and the investigations of the economic mycologist are made with a view of learning the habits of these, in order that he may determine the best methods of combatting them.

Despite the fact that these microscopic foes have destroyed our crops for years, causing annual losses of millions of dollars, no intelligent attempt worthy of note was made to investigate them until within the past ten years. Five years ago practically nothing had been done in this country toward checking their ravages; in fact, it is only during the past three years that anything like a systematic effort in this direction has been put forth. At the outset, investigators in this branch of science were beset with many difficulties, chief among which was the entire lack of knowledge on the subject among the very people the work was intended to benefit. This state of affairs was not the fault of any one in particular, certainly not that of the farmers themselves, as they could not well be expected to be familiar with a subject upon which there was practically no accessible literature. Be this as it may, however, the trouble has been a serious drawback, especially in the treatment of diseases where some knowledge of the causes at work is absolutely essential to success. It is astonishing how difficult it is to make a farmer understand what a fungus is, and how it is that such an apparently insignificant thing can make his potatoes rot, his grapes mildew or his apples scab. With the ravages of insects it is different, for in the majority of cases the intruder can be seen at work, and the farmer has tangible evidence of what is doing the damage. Fungi, in the majority of cases, come "like a thief in the night," the farmer having no knowledge of their presence until the damage is done. Right here, let it be understood, is where we have our greatest difficulty, for it is hard to convince our friend that he must not wait until the enemy is present, but must take time by the forelock and make preparations accordingly. In other words, there is a strong tendency in all cases to resort to curative rather than preventive measures, and in consequence failure is often the result.

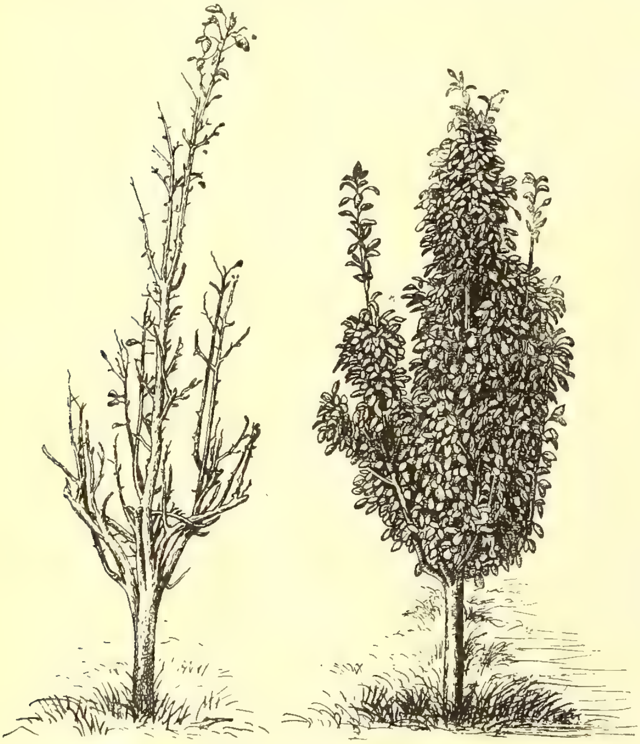

FIG. 1. FIG. 2.

THE OLD WAY AND THE NEW.

Fig. 1. Pear tree injured by leaf-blight. Fig. 2. One saved by treatment.

As the habits of fungi become better understood, farmers and fruit-growers show an increased interest in them. They are now discussed at many of our horticultural and agricultural meetings and, in many other ways, are more a subject of investigation than of mystery.

Laying aside these questions for the present, let us follow for a moment the progress of economic mycology from the time of its first inception in this country up to the present moment.

One of the pioneers in these investigations was Professor T. J. Burrill, of the Illinois State University, who first began to devote special attention to the subject sometime back in the seventies. At about the same time Dr. W. G. Farlow, of Harvard College, started the publication of a series of most valuable papers, which were continued up to a few years ago. Among others who contributed to the early history of this work, may be mentioned Professor Chas. Peck, of the New York State Museum of Natural History, Dr. B. D. Halsted, Dr. Chas. Bessey and others. In 1883 some work of this nature was inaugurated at the Wisconsin Experiment Station by Professor Wm. Trelease, and the year following J. C. Arthur, of the New York Experiment Station, began a series of important investigations which were continued for four years, or as long as Mr. Arthur was connected with the Station.

Since the organization of the Hatch Experiment Stations, the work has received a new impetus, there being economic mycologists connected with a number of these, all of which are doing valuable work.

It was not until 1885 that the importance of investigating the fungous diseases of plants was recognized by the National Government, and it was largely through the efforts of the botanists of the country that this was brought about. Commissioner Colman's attention being called to the matter, he placed the work in charge of F. L. Scribner, who had been for some time connected with the department. Mr. Scribner resigned in 1888 to accept a position in the Agricultural Experiment Station of Tennessee, since which the work has been in charge of the writer. From the small beginning made five years ago this branch of the department has steadily grown, until to-day it stands on an equal footing with the other divisions.

Its work is naturally divided into two classes: studies in the laboratory, with a view of tracing the life histories of the various fungi in order to discover the best methods of combating them; and field experiments or practical tests of such preventive measures as the laboratory work may suggest. To carry on this work successfully, a corps of trained experts is kept constantly employed in the laboratory, while special agents in different parts of the country devote a good share of the growing season to experimenting with the remedies.

Let us now see what have been some of the practical results of this work. In the first place, grape growers everywhere have been made acquainted with the causes of such diseases as black-rot, downy mildew and anthracnose; moreover, it has been proved to their entire satisfaction that these diseases can be prevented by proper treatment. Between two and three thousand grape growers in all parts of the country used the remedies in 1889, and, from estimates based on reports received from about thirty, we know that the actual saving in money to these, above all expenses, was something over $15,000. Our agents last year, in treating potatoes for blight and rot, succeeded in saving 75 per cent. of the crop. On this basis, the amount saved to the entire country, if all the infected districts had been treated, would have been something over a million dollars.

To give a more detailed example of the practical value of this work, we will furnish the results of an experiment made by us in treating pear leaf-blight. The actual cost of treating a block of 5,000 trees has been a little less than $100. This includes treating the trees seven times last year, before and after they were budded, and four times this season. Out of the 5,000 trees, not 500 were lost, and as the block now stands it is worth at least $7,000. Heretofore it has been an unusual thing to bud half of the stocks; in fact, the loss from this source is usually about 60 per cent. Assuming, however, that the loss would have been 50 per cent., we, at an expenditure of $100, saved $3,500. Many examples of this kind might be given, but enough has been said to illustrate our point. Figures 1 to 4 will also enable the reader to judge something of the effects of treatment. Fig. 1 shows a pear tree attacked by leaf-blight, while Fig. 2 shows an adjacent one which had been treated with fungicides. The grape clusters are from photographs, and represent fairly well the difference in the fruit, as seen the 25th of July of this year on treated and untreated plats. By the time the fruit usually ripens there will probably be none on the untreated plats to harvest, while the treated will without doubt yield from four to eight pounds per vine.

Now let us notice the discoveries made in the matter of fungicides or remedies for plant diseases, and also bring to mind the recent improved methods of applying these substances. Ten years ago about the only fungicide used was the flowers of sulphur. Now, thanks to the investigators of this country and Europe, a score or more of substances are in con-

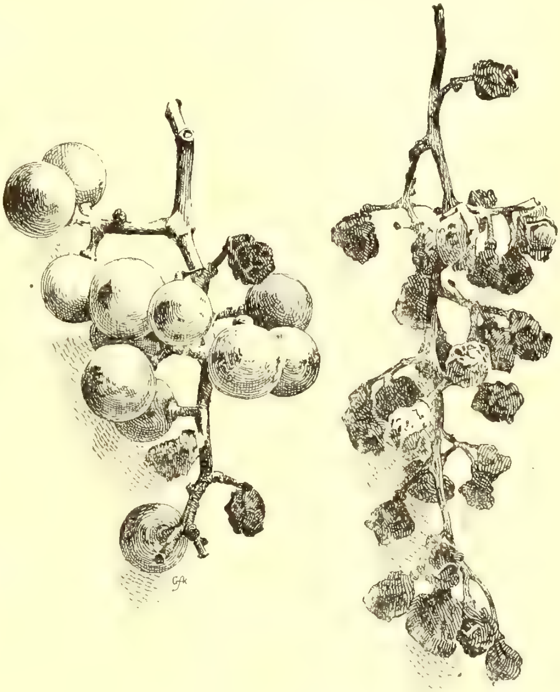

FIG. 3. FUNGI AND NEGLECT.

stant use, chief among which are the salts of copper and various combinations of the same with lime, ammonia, carbonate of soda, etc. The copper preparations are now used in preference to all others, partly because they are cheap, but more especially on account of their effectiveness and the ease with which they are prepared and applied. The cost of using them depends of course on many variable conditions, so that it is difficult to make any definite statement on this point. As a rule, however, it may be said that for the three preparations of copper now most extensively used—the Bordeaux mixture, the ammoniacal solution and the modified eau celeste—the cost of treating bearing grapes will range from one to two cents per vine for the season. The Bordeaux mixture is a more costly preparation than either of the others, but so far it has proved most effective, and in reality, therefore, is the cheapest. Large apple or other fruit trees can be treated the entire season for from 15 to 20 cents each, while with nursery stock the cost will vary from 20 to 50 cents per thousand. I am sure that, so far as discoveries and important improvements are concerned, there have been fully as many here as in other branches of the science.

FIG. 4. A STITCH IN TIME.

Many improvements have been made within the past two years in apparatuses for applying fungicides. Grape growers were at first forced to resort to the wasteful method of applying the remedies with old brooms and wisps of straw. All this was changed, however, by the advent of the improved knapsack sprayers which were introduced by the Department of Agriculture in 1887 and first used in the treatment of black-rot and downy mildew of the grape. For a time all knapsack machines were imported from France, there being nothing of the kind manufactured here. In 1888, a knapsack pump similar to those used by the French was invented by Mr. Adam Weaber, of Vineland, New Jersey. A great many of these machines have been sold, but owing to the price it is practically beyond the reach of a large majority of gardeners and fruit growers. To overcome this difficulty, we have recently designed a sprayer of which the actual cost need not exceed $12. This pump has been used quite extensively the present season, both in the nursery and vineyard, and so far it has given entire satisfaction. Any one has the privilege of making it, but those who do not wish to go to this trouble can obtain it from any of the various firms who are offering it for sale.* Great improvements have recently been made in spraying nozzles, the thick, pasty nature of some of the fungicides having made it necessary to modify considerably the well-known nozzles used in applying insecticide substances. Probably the nozzle now most extensively used is that shown attached to the lance in Fig. 5. This has been evolved from the

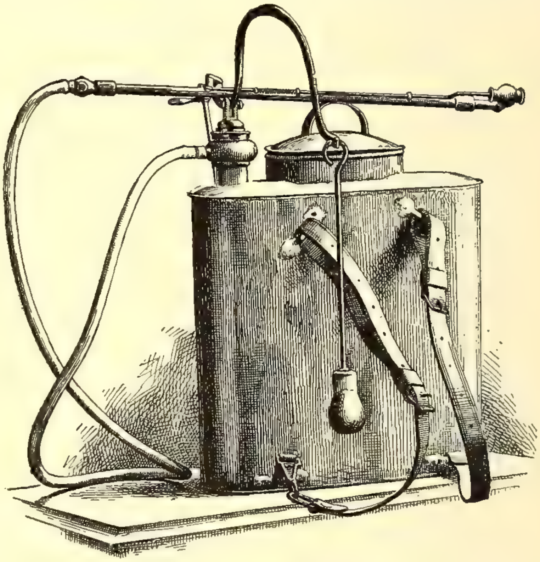

FIG. 5. A NEW KNAPSACK PUMP AND TANK.

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*Albinson & Trusheim, 2026 14th street, Washington, D. C.; Columbia Brass Works, Washington, D. C.; Field Force Pump Co., Lockport, New York.

cyclone or Eddy chamber nozzle, and for general use in our work it has no equal. Fig. 6 shows the manner of handling the apparatus.

Economic mycology has such a vast field before it that no one can predict what the next few years may bring forth. We can only point out in a general way some of the probable advances which our present knowledge leads us to believe will be made in the immediate future. In the first place, there are the diseases of our cereals, which have received very little attention. The losses to our grain crops from the ravages of rusts and smuts is beyond calculation. Again, there is an immense amount of work to be done in the south and extreme west, especially on the diseases of citrus fruits, cotton and other crops peculiar to these regions. The diseases of our small fruits have hardly been noticed, and so we might go on through a long list of maladies. In every case it will be necessary to study thoroughly the life history of each parasite, as it is only by knowing every stage of its existence that we can hope to successfully combat it. In addition to the diseases mentioned, there will be constant outbreaks of new maladies demanding immediate attention. Such occurrences are not uncommon, as is shown by the appearance in California within the past four years of a disease among the grapes which has already caused millions of dollars damage.

As to the matter of fungicides and fungicide appliances, there is an immense field for improvement. As yet the main effort of mycologists has been in the direction of finding effective remedies without regard to expense, so that there is much to be done toward cheapening the cost of treatment. In our experiment stations, where mycology and entomology are often combined, much might be done in the way of experimenting with fungicides and insecticides combined. There is a promising field here for investigation, and already several states have entered it.

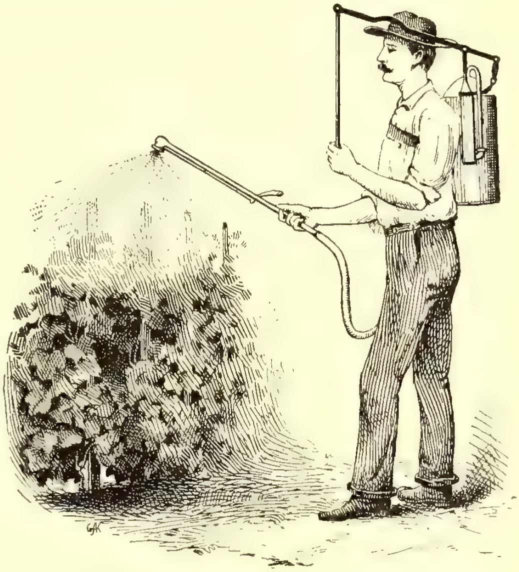


FIG. 6. RUNNING THE KNAPSACK PUMP.

Legislation against these pests is another matter that is just beginning to be recognized as an important means of holding them in cheek. New Jersey has quite recently enacted a law looking toward the protection of her principal crops from the ravages of fungi, and there is no doubt that if the matter were properly agitated, other states would soon follow her example.

It is gratifying to know that the United States stands at the head of all countries in the practical work she is doing in this direction. France and Italy are doing an immense amount of work, but their efforts are confined almost wholly to the grape.

Washington. B. T. GALLOWAY.

THE NEW AMERICAN MULBERRY.

Fig. 1, Frontispiece.

THE New American is one of the very best of the mulberries for cultivation in the north. It is hardy, vigorous and productive, and the fruit is large and of pleasant quality. The fruit is black at full maturity, an inch and a half in length, and evenly cylindrical. It ripens during July and early August.

I am unable to obtain any information as to the origin and history of this mulberry. Ellwanger & Barry, who furnished the specimen from which the illustration is made, tell me that they have handled it about ten years. A tree upon their grounds at Rochester, N.Y., measures several inches in diameter at the top of the trunk and is regularly loaded with the long and pretty fruits. It is considerably grown in California.

It is strange that the mulberries are not more generally known and cultivated. They succeed under any ordinary treatment, and their sweet and juicy fruits, ripening through four to six weeks, add a pleasant variety to the fruit garden. The fruit is unknown in our markets, although many inferior ones are common. The New American, Downing (*Downing's Everbearing*), Johnson and Hicks (*Hick's Everbearing*) are the most reliable varieties. The Downing originated upon the Hudson with the Downings from the seed of the famous *Morus multicaulis*, which was introduced to feed silk worms. Of late years the Russian mulberry has been widely disseminated, and as it is comparatively worthless, it will be likely to prejudice many people against the mulberry. The wild species, *Morus rubra*, has long been cultivated to a limited extent, and it is worthy of greater attention.

The mulberry thrives best in a good sandy loam. Three or four trees will ordinarily supply a family. The tree requires little pruning or care. It is readily propagated by cuttings, either of the recent wood or of roots. It is also grafted. It is a long-lived tree, and it sometimes attains a considerable size. It is not uncommon to find specimens of the old-fashioned white mulberry a foot and a half in diameter at the base and twenty-five feet high. Many of the varieties are hardy in Michigan, New York and Massachusetts.

As ornamental trees, the mulberries possess merit. They are particularly conspicuous because of the curious and various lobing of the leaves. Individual trees vary much in style of leaf, even of the same species, and the lobing of the leaves on the upper branches is often different from that on the lower ones. A batch of mulberry seedlings often presents an interesting study in this direction. Mulberries are among the last trees to leaf out in spring, but in late summer, when most other plants have lost their special charms, the mulberry begins to ripen its sweet and curious fruits. In most varieties the fruits ripen successively through a number of weeks. I picked the last fruits from a large mulberry tree this year in September. This habit of continuous ripening obscures the amount of fruit which a mulberry tree bears. A member of the Western New York Horticultural Society stated at the last meeting that he has a tree which bears ten bushels in one season.

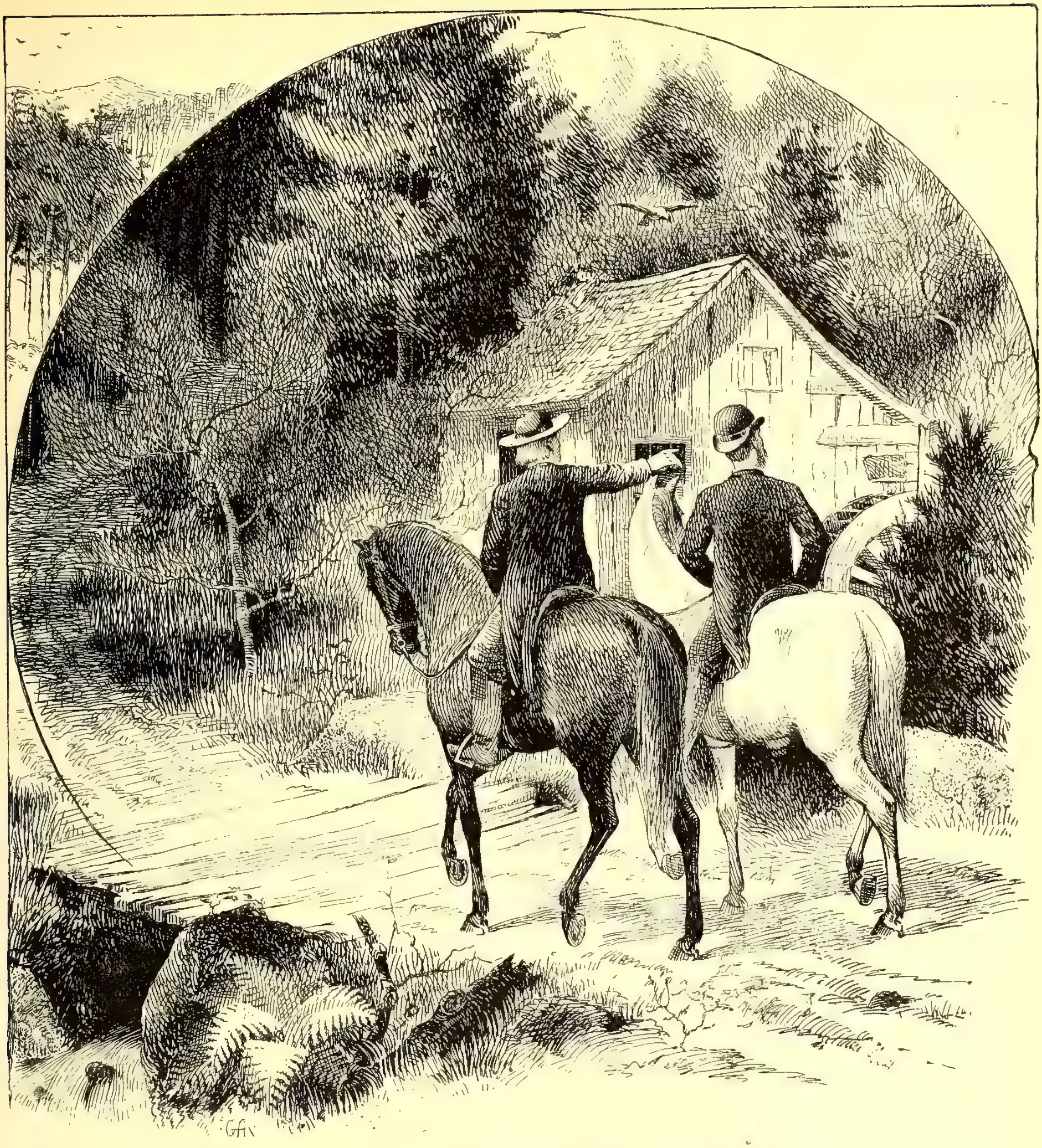
The mulberry has become most widely known through its value in silk culture, but in the north, at least, it is more valuable as a fruit-bearing tree.

L. H. B.

"O, the mulberry tree is of trees the queen!
Bare long after the others are green,
But as time steals onward, which none perceives,
Slowly she clothes herself with leaves.

* * *By and by when the flowers grow few,*
And the fruits are dwindling and small to view,
Out she comes in her matron grace
With the purple myriads of her race.

—D. M. MULOCK.



"A Quaint old Mill, with an Overshot Wheel."

A MOUNTAIN TRAMP—I.

If THESE papers are not so entirely horticultural as the readers of The American Garden have been accustomed to look for in their favorite magazine, the writer begs to say in explanation that he found certain other indigenous products of the Tennessee mountains, *i. e.*, the men and women who have their being there, of quite as much interest as the fruits and flowers of that rugged soil.

This was my thought as I stood upon the platform of a desolate little railway station and watched the train that had brought me—the only visible connecting link between myself and civilization—speeding away again into the busy world that lay beyond that furthest range of hills. Then I turned to my friend, who was waiting: "My mission can best be represented by a huge interrogation point," I said. "I want to know all about the mountains, the people, their history, habits, traditions, occupations, etc.,

etc., *ad infinitum*. I want to know everything about them that there is to know."

I had come to the right market to buy my wares. The Colonel had been among the mountains for years—before the railroad, before the land companies and speculators, before the mining prospector, before the novelist and summer tourist. He was an encyclopedia of valuable information, but he had no intention of allowing me to acquire my knowledge at second hand; I must get it by observation and experience.

"You are just in time. I have business to-morrow that will take me up the mountain, and to a typical mountain town. I will have horses ready at day-break."

It was mid-December; we were on the Cumberland plateau. The morning dawned bright and warm and the mercury stood at 65° as we started out. The ground was dry and firm, and the dead leaves rattled crisply under our horses' feet while we went at a brisk pace along the bridle-path that led into the heart of the forest.

We were already on the "mountain"—that local apellation embracing all that gigantic upheaval of the plain which constitutes the plateau—at an elevation of some fifteen hundred feet. Our way lay along the undulations of this table-land, now up, now down, but gradually ascending for five hundred feet more. About us, as far as the eye could reach, was the forest; sometimes a vast expanse of spreading oaks, their sere foliage giving ruby glints in the sunlight; again a sombre wall of towering pines, standing tall and straight, and waving gracefully in the wind.

Upon the levels the vision could penetrate but a little way, because the trees clustered so thickly; but, from points of vantage upon some slight elevation, we could look far off over ridge and hollow, and over succeeding ridges beyond, until the definite sense of vision was lost in that last indefinable line of blue that blended the mountain and the sky in one. Back to earth again, and in the pine woods where the trees grow so close together, many hundred upon each acre, we see that the trunks are free from branches except at the very top. The dense shade that they make for themselves as they grow is unfavorable to the development of branches, the whole energy of the tree being expended in the effort to reach above its fellows to the light. This tendency to struggle toward the light is as apparent in the tree as it is in the plant which always turns toward the glass in the window-garden at home. So to this, the "excelsior" desire in nature, is due the smooth, tender boles of these pines, just tipped with spreading green branches, and rivalling palms in their gracefulness.

In these pine forests it is always twilight, except when it is blackest night. The direct rays of the sun rarely penetrate the green canopy. Some slanting ray of light finds here and there an opening, and wanders in below and flits like a will-o'-the-wisp among the tree trunks, growing ever more dim and mellow until it loses itself amid the pervading gloom.

Now and then we dip down into a ravine where a stream of fresh water runs, and upon whose banks the rhododendron and the mountain laurel grow. We stop to gather some leaves of the rhododendron, long, narrow, dark and glossy, like the leaves of the rubber plant. A big, yellow bud is at the axil of each cluster, looking as if it was ready to burst into sudden bloom, although it is mid-winter, and not mid-summer, by the calendar. The promise that it gives almost makes us wish that it had been our fortune to come later, when the bloom and not the bud alone could greet us. Yet our horses even now are sweating under their sharp work, and the sun is getting up straighter above the tree tops and sending down warmer rays upon us. While the horses refresh themselves with great draughts of cool water, we take a closer look at the characteristic vegetation about us.

A group of water-birches stands a little way up the ravine, and I have a fancy to strip some of their bark to make a mountain note-book. Stripping off the outer layers, which are somewhat rough and ragged, I find the inner surfaces smooth, firm and lighter in color, and taking the ink from my fountain pen very well. It is a fit medium to carry the notes of the mountain.

Besides the birches we find a sourwood (oxydendrum), which bears such a pretty cluster of bell-like blossoms that our English cousins have adopted it for ornamental planting, re-christening it "The American Lily of the Valley." Even under so sweet a name, no doubt, its foliage remains as acid to the tongue as here in its native habitat, where it amply justifies its name. A plant, as well as a prophet, may gain honor by journeying to a far land; our common mullein grows in many an English door-yard, where it is yclept "The American Flannel plant!" And they who do these things are right; for many a plant that we term a weed is full of grace and beauty; at the most, a weed is only a plant out of place; the milk-weed and the thistle are beautiful in bud and blossom, and more beautiful yet in the last scene of all, when, on wings of feathery down they scatter their seeds abroad in the land that they may produce, each after its own kind.

The Christmas season is near, much as this weather belies it. The green leaves and red berries of the holly gleam from the hillside, while the gaunt arms of the sycamore and the black-gum are festooned with mistletoe. Woe now to the mountain girl who pauses in her walks abroad, for here is our warrant plain, to catch and kiss her under every tree!

We have noticed, as we journeyed south, that the mistletoe seems to have a special affinity for different trees in different latitudes. A little further north, in the Kentucky blue grass country, it will be found almost only on the wild cherry and the black walnut; but neither here nor there is it true to its Druidical story, and one must go still further north, across the Ohio, to find it where it is popularly supposed to be most common, upon the oak.

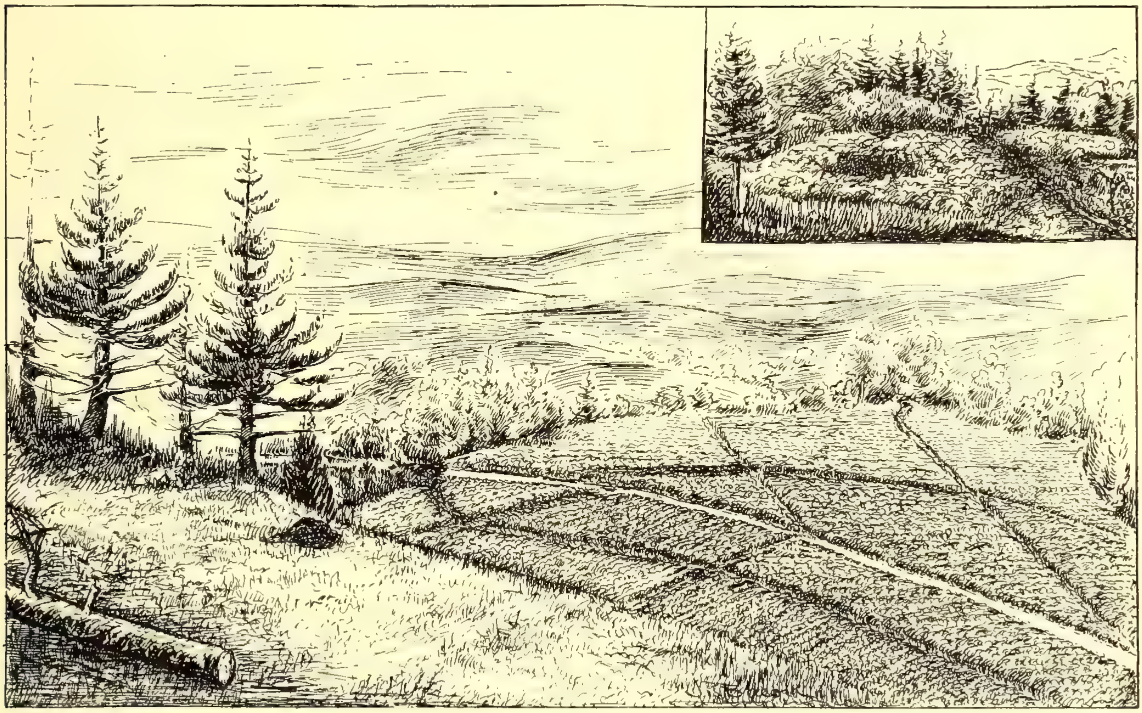


FIG. 1. A CULTIVATED CRANBERRY BOG.—A BIT OF WILD MARSH.

Along the face of an overhanging cliff we find the rare English fern; while the commoner, but no less beautiful climbing fern makes green patches amid the carpet of brown leaves. Looking still closer down at mother earth, we find yet borne upon her bosom—this sixteenth day of December, A. D. 1889, some flowers of the delicate "Quaker Maiden," or bluets, *Houstonia cærulea*. Stooping to gather them, we get the fragrant scent of English violets, and uncovering a cluster of these, both are laid in the note-book beside some blossoms of the *Jasminum nudiflorum*, gathered from before the door of a mountain cabin.

Again in the saddle and riding on. The Colonel points to the long, black gashes in the trunks of the larger pines, and tells how the mountain people used to gather turpentine here. Whether the industry became unprofitable, or whether the people became so opulent that they did not care to pursue it any longer, he refrains from saying. The gashes in the trees were cut about three feet from the ground, and the gum collected as it would exude. The charred appearance has been wrought by the fires which run over the mountain periodically, consuming the dead leaves and undergrowth, and which finds a special affinity in these pitchy surfaces.

Since this industry was abandoned another has been taken up, which is followed, however, only in the most desultory manner; for your true mountaineer does not cultivate the faculty of long and continuous effort! Now, when they stand in need of cash or its equivalent to exchange at the stores for such simple necessaries as are not produced by themselves, they dig the roots of the ginseng and yellow-root, with which these woods abound.

The morning wears away without incident, and indeed none is needed, for life is full and satisfying there in the heart of nature without artificial aids. It is enough merely to *be*, to breathe the pure mountain air, to drink from these limpid streams, to feel in harmony with the life about one. It requires no astral perception to know that this is *living*.

An evidence of civilization is passed—a quaint old mill with an overshot wheel, from which falls a musically tinkling cascade. But few grists are ground here now, we judge, for two hawks came circling about and settled down close by us, showing that they are not enough familiar with the presence of man to fear him. They will be wiser by-and-by! We meet an occasional traveller to whom the Colonel says "howdy," with the true mountain intonation, and "howdy" is said in return. Sometimes we stop for a moment's chat; once with a soldierly-looking man who rode a handsome thoroughbred. His manner was courteous and dignified; when he had passed on his way the Colonel told his story. "A northern guerrilla during the war; his hands stained with crimes committed under cover of a uniform; an illiterate man, who can neither read nor write, yet has twice represented his district (a mountain district) in the legislature. Now respected by his neighbors, and always throwing his influence on the side of law and morality." Thus, in brief but striking outline is sketched, throughout the day, many a "character," for my companion knows the whole "mountain."

I mention the curious vernacular of the people whom we meet, and the Colonel is launched upon a philological dissertation.

"They speak a language of their own," he says. "Their vocabulary is limited, numbering among the most illiterate not more than two hundred and fifty words. Some of these are distinctively their own, coined here exclusively for home circulation; such are *biggitty* and *bourdacious*. Others are local corruptions of the English, such as *hit*, for it; *cayn't*, for cant, and *mought*, for might. Then there is the peculiar bearing down upon the final syllable, as in settle*ment*." They do not pronounce it settle*mint*, as I had expected to find from the stories of a well-known writer; but that may be explained by the fact, as I was frequently assured, that her characters were all "over on t'other mountain"—not mount*ing*, observe again—but mountain.

Aside from such distinctive features of their vocabulary, their words are commonly pronounced with marked purity; there is no trace of the corrupting influence of the negro idiom which has helped to make so slovenly the pronunciation of even the best classes in the old slave-holding districts of the south. This is to be accounted for by the fact that there were never any slaves held here, the poverty of the mountaineers prohibiting their indulgence in such luxurious chattels; even now a black face is a rarity here, the negroes not having much affinity for the hardships and privations of mountain life.

Later on I was enabled to verify some of the Colonel's statements by my own observations. That night, at the house where we found entertainment for man and beast, a woman gave her opinion of a certain lawyer who had recently passed through there with the court.

"I don't like that man," she said. "He's getting too biggitty to drinken his coffee outen a sasser." From which we inferred that the mountain possessed a standard of table etiquette peculiar to itself. This opinion was given in a sad, hopeless manner, without apparent animosity toward the individual referred to, but only as if he had fallen beyond reclaim. A translation of this word "biggitty" is not necessary when one has once heard it used. It is very expressive. A tipsy fellow, who seemed to be the soul of maudlin good-nature, was said to be "right vigorous" when in his cups. The way in which the word was pronounced (*i* as in tiger) indicated that tigerish, or fierce, was the synonym.

A tall, thin, mild-mannered man was asked to be our guide to a certain point. "I don't care to,' quoth he, and forthwith lifted up his long length, and went. This, we subsequently found, was a universal form of assent.

Our day's journey came to an end at a little hamlet—as my friend had promised, a typical mountain town. But night came down before we found our haven, and the bridle-path became faint and uncertain in the darkness. Once we paused, almost dismayed at the difficulties that beset us as the forest closed about, deep, dark and sombre, seemingly disposed to hold us fast in its inexorable grasp. Just then a sound broke upon the air—the voice of a girl, singing. A rich, contralto voice, strong but untrained, sending out into the night and the wilderness not, as we would have expected, some negro melody or the strains of a camp-meeting song, but a stave of an old college tune. It was a strange thing to hear there, but it came carolling out to us again and again—

"Oh! who will kiss my sugar-sweet lips?"

We listened in silence until the singer had finished, too much surprised to answer even had we been sure that any answer was desired. Then the Colonel made his way in the direction from which the voice had come, and found a cabin hidden among the pines. Having taken his bearings anew, we resumed our way and were soon at our destination.

A supper of corn-bread, muddy coffee, fried pork, fried chicken, fried eggs, fried potatoes, fried turnips and sundry other fried things preceded our introduction to a little room with a huge fireplace, in which some logs were smoldering and smoking. Two beds, one of which was already pre-empted by three tow-headed children, suggested that this was where we should seek repose. I went outside, partly to commune with nature, partly to escape the smoke and the unaccustomed odors.

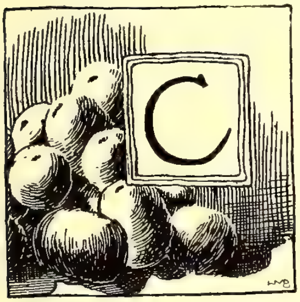
The night was intensely dark; not a star was to be seen, not a single ray of light penetrated the over-hanging canopy of cloud. The dark fringe of the forest, that had made a dense, black shadow before, was now absorbed into the all-pervading blackness of the night. The wind soughed faintly and dolefully; the far-away cry of a hound chasing some belated reynard to his hole, was blended with it. Nearer, sounded the occasional weird hoot of an owl, prowling for prey. It was grand, mysterious, sublime; it was night on the mountain.

"It is the abomination of desolation." The Colonel stood beside me, and had spoken his thought aloud. He was correct, as usual. I was glad I had kept mine to myself!

James K. Reeve.

CAPE COD CRANBERRIES.

A DISTINCTIVELY AMERICAN INDUSTRY—ITS MOODS AND TENSES.



CRANBERRY-GROWING is the most unique of our horticultural industries. It is entirely unlike anything else. All one's knowledge of gardening and fruit growing in general is of no avail when he undertakes to grow the cranberry. He must lay aside his common notions of soils and tillage, and even discard the very tools which from boyhood he has considered the essentials to any kind of cultivation.

The cranberry-growing sections of the country are few and scattered. The Cape Cod district is the pioneer ground of cranberry culture, and it still undoubtedly holds first rank in general reputation. The country in which these Cape Cod berries is produced is a most peculiar and interesting one. In fact, it is a surprise to anyone not intimately acquainted with it.

Let the reader lay before him a map of Massachusetts, and let him locate Plymouth and Barnstable counties upon its eastern extremity. Upon the south, Buzzard's bay thrusts itself between the two counties, and all but cuts off the long and low hook which stretches eastward and northward to Cape Cod. In provincial parlance the Cape Cod region includes all the peninsular portion of the state, beginning with the lower and eastward projection of Plymouth county. The cranberry region extends from this eastern portion of Plymouth county eastward to the elbow of the peninsula, or, perhaps, even farther.

Upon one of the upper arms of Buzzard's Bay the reader may locate the old and quaint town of Wareham. Here the tides flow over long marshes bordering the inlet, and rise along the little river which flows lazily in from the Plymouth woods. Here the sea-coast vegetation meets the thickets of alder and bayberry and sweet fern with their dashes of wild roses and viburnums. And in sheltered ponds the sweet water-lily grows with rushes and pond weeds in the most delightful abandon. In the warm and sandy glades two dwarf oaks grow in profusion, bearing their multitude of acorns upon bushes scarcely as high as one's head. The dwarf chestnut oak is often laden with its pretty fruits when only two or three feet high, and it is one of the prettiest shrubs in our eastern flora.

We drive northward over the winding and sandy roads into the town of Carver, where the largest cranberry plantations are located. We are now headed towards Plymouth, and our journey lies in the "Plymouth woods." And here the surprises begin! Do you look for fields of corn and grass, and snug New England gardens, and quaint old houses whose genealogies run into centuries? Yes, you are picturing an old and overworn country, from which the impetuous youths have long ago fled to the new lands of the west. But while we are busy with our expectations, we are plunging into a wilderness!—not a second growth, half-civilized forest, but a primitive waste of sand and pitch pine and oaks! The country has never been cleared, and it is not yet settled! And in its wilder portions deers are still hunted and lesser game is frequent! And only fifty miles away is the bustling hub of the universe!

This Cape Cod region is but a part of the sandy waste which stretches southward and westward through Nantucket, along the north shore of the sound and throughout a large part of Long Island; and essentially the same formation is continued along the Jersey seaboard.

Similarities of soil and topography are always well illustrated by the plants they produce. The "pine barren" flora of New Jersey reaches northward into the Cape country, only losing some of its more southern types because of the shorter and severer seasons. But more diligent herborizing will no doubt reveal closer relationship between New Jersey and Cape Cod than we now know. An instance in my own experience illustrates this. The striped sedge (*Carex striata*, var. *brevis*) is recorded as a rare plant, growing in pine barrens from New Jersey southward, and yet in these Plymouth woods, in the half sandy marshes, I found it growing in profusion. Even eastern Massachusetts is in need of botanical exploration! So the floras run along this coast; and it is not strange that Cape Cod and New Jersey are both great cranberry producing regions.

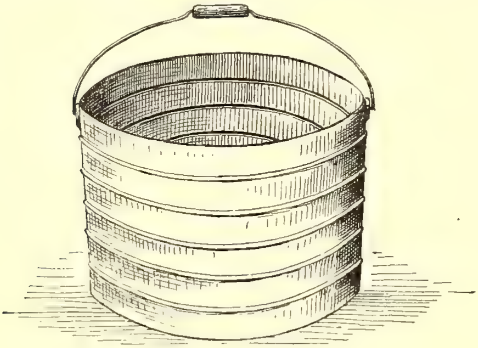


FIG. 2. CRANBERRY MEASURE.

The country comprises an alternation of low, sandy elevations and small swamps in which the cassandra, or leather-leaf, and other heath-like plants thrive. The pitch pine makes open and scattered forests, or in some parts oaks and birches and other trees cover the better reaches. Fire has overrun the country in many places, leaving wide and open stretches carpeted with bearberry (arctostaphylos) and dwarf blueberries. There are no fences, no improvements, except such improvised structures as may be seen now and then about some isolated cranberry bog. At one place we came suddenly upon a school house of perhaps twelve by twenty, standing lonely and bare in the midst of a scrub oak wilderness, with not a house in sight. Clear and handsome little lakes are found in some parts of the wilderness, and upon the banks of one we found a hermitage where a half dozen Boston men shut themselves off from the world in the summer months. Everywhere one finds clear and winding brooks, abounding in trout. And over all the open glades, the great-flowered aster (*Aster spectabilis*) is brilliant in the autumn sun.

It is in the occasional swamps in this sandy region that the cranberry plantations, or "bogs" as they are called in Massachusetts, are made. In their wild state these bogs look unpromising enough, being choked with bushes and brakes, as shown in the corner-piece of Fig. 1, page 582. It has required considerable courage to attack and subdue them. I am filled with a constant wonder that the sandy plains are not also utilized for the cultivation of blueberries. These fruits now grow in abundance over large areas, and they are gathered for market. It would only be necessary to enclose the areas, protect them from fire, and remove the miscellaneous vegetation, to have a civilized blueberry farm. Certainly cranberry and blueberry farms would make an interesting and profitable combination. The expense of growing the blueberries would be exceedingly slight, and the crop would be off before cranberry picking begins. With greater attention given to the crop, we should no doubt soon find out why it is that the berries fail in certain years, and it is possible that some control could be exercised. I have often predicted that large areas of the great pine plains of Michigan—which look almost exactly like the Massachusetts barrens—will eventually be used for the growing of blueberries. To be sure, wild berries are yet common, but they would not interfere with the sale of better and cleaner berries which should come from civilized plantations. Wild cranberries are still abundant over thousands of acres, and the production of cultivated berries is rapidly increasing; yet the price has advanced from 50 cents and $1 per bushel, with an uncertain market, 50 years ago, to 15 and 20 cents a quart. Wild blackberries are still abundant, yet they do not interfere with the sale of cultivated sorts.*

The largest cultivated bog in existence lies about six miles north of Wareham, and is under the management of A. D. Makepeace, one of the oldest and most experienced cranberry growers in the country. This bog is 160 acres in extent. Other bogs in the vicinity belong to the same management. These bogs are all as clean as the tidiest garden. The long and level stretches, like a carpet strewn with white and crimson beads, are a most pleasing and novel sight. Here in early September a thousand pickers camp about the swamps, some in temporary board cabins, but most of them in tents. The manager furnishes the provisions, which the campers cook for themselves, and he rents them the tents. One hundred and twenty pickers constitute a company,

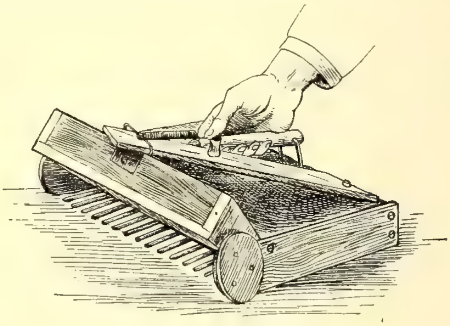


FIG. 3. PICKER.

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*We shall soon publish an illustrated article upon the huckleberries and blueberries.

which is placed in charge of an overseer, and each company has a book-keeper. Each picker is assigned a strip about three feet wide across a section of the bog, and he is obliged to pick it clean as he goes. The pickers are paid by the measure, which is a broad six-quart pail with ridges marking the quarts (Fig. 2). Ten cents is paid for a measure. There is wide variation in the quantity which a picker will gather in a day, ranging all the way from 10 measures for a slow picker, to 40 and even 50 for a rapid one; and in extra good picking 75 measures have been secured.

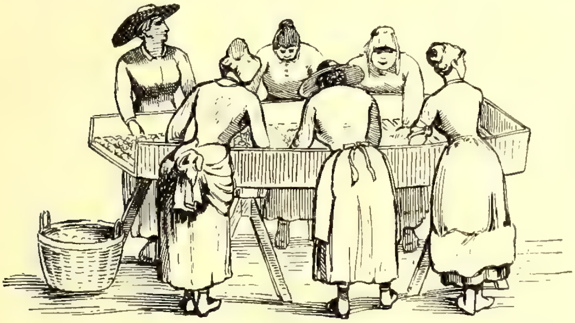


FIG. 4. SCREENING THE BERRIES.

Various devices have been contrived for facilitating cranberry picking. The Cape Cod growers like the Lumbert picker best. This is illustrated in Fig. 3. This is essentially a mouse-trap-like box with a front lid raising by a spiral spring. The operator thrusts the picker forward into the vines, closes the lid by bearing down with his thumb, and then draws the implement backwards so as to pull off the berries. Perhaps a fourth of the pickers use the implements. Children are not strong enough to handle them continuously, and where the crop is thin they possess little advantage. Raking off the berries is rarely practiced in the Cape Cod region. It is a rough operation, and it tears the vines badly. Late in fall, if picking has been delayed and frost is expected or pickers are scarce, the rake is sometimes used. An ordinary steel garden rake is employed. The berries are raked off the vines, and the bog may then be flooded and the berries are carried to the flume, where they are secured.

This picking time is a sort of a long and happy picnic—all the happier for being a busy one. The pickers look forward to it from year to year. They are invigorated by the change and the novelty, and they must come near to nature in the sweet and mellow October days. Those of our readers who have cast their lot with hop pickers, or who have camped in the clearings in blackberry time, or who have joined the excursions to huckleberry swamps, can know something of the experiences of the cranberry picker. Yet I fancy that one must actually pick the cranberries in the drowsy Indian summer to know fully what cranberry picking is like.

The berries must now be sorted or "screened." If there are no unsound berries, the fruit can be fairly well cleaned by running it through a fanning mill; and some growers find it an advantage to put all the berries through the mill before they go to the hand screeners. A screen is a slatted tray about six feet long and three and a half wide at one end and tapering to about ten inches at the other, with a side or border five or six inches high. The spaces in the bottom between the slats are about one-fourth inch wide. The screen is set upon saw-horses, and three women stand upon a side and handle over the berries, removing the poor ones and the leaves and sticks, and working the good ones towards the small and open end where they fall into a receptacle (Fig. 4). The berries are barrelled directly if they are not moist, but if wet they are first spread upon sheets of canvas—old sails being favorites—and allowed to remain until thoroughly dry.

The cultivated cranberry is a native of our northern states. It was first cultivated about 1810, but its culture had not become general until 40 or 50 years later. The berries naturally vary in size and shape and color, and three general types, named in reference to their forms, were early distinguished—the Bell, the Bugle and Cherry. These types are represented in Figs. 5 to 7, respectively. So late as 1856 there appears to be no record of any particular named varieties aside from these general types. But there are many named sorts in cultivation now. These have been multiplied from some superior or distinct plant which someone has observed and marked. Mr. Makepeace showed me seven varieties in his largest bog.

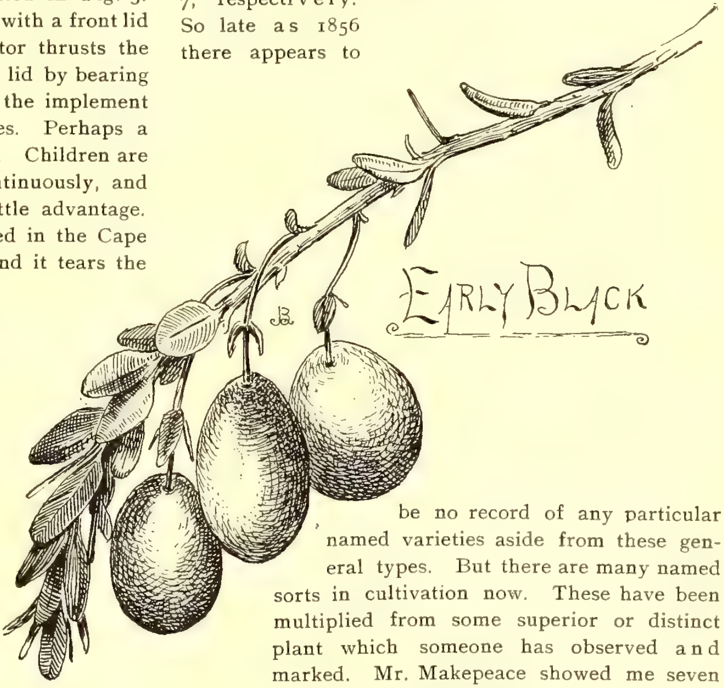


FIG. 5.

The common favorite is the Early Black, shown natural size in Fig. 5. This is valuable because of its earliness, as it comes in three weeks ahead of the medium sorts. Picking begins upon this variety about the first of September in the Cape Cod bogs. When fully ripe, the berries are purple-black, and for this reason they are favorites with consumers, for it is a common though erroneous notion that pale berries are unripe. In late fall, the foliage of the Early Black assumes a purplish tinge, which quite readily distinguishes it from any other variety.

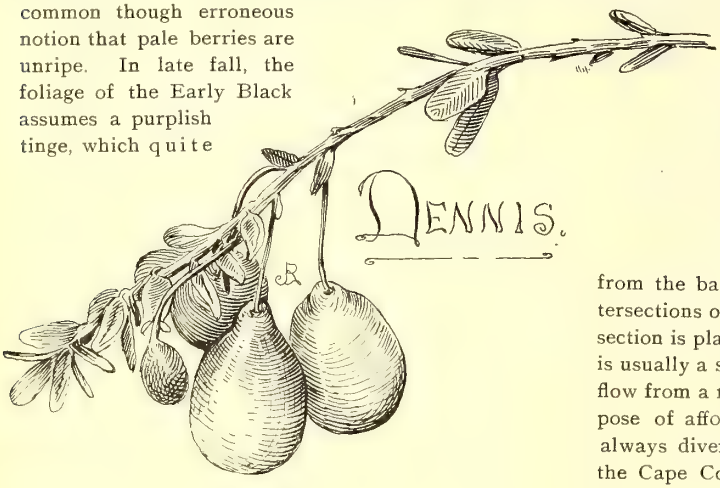


FIG. 6.

The Dennis, a bugle berry (Fig. 6), is also a favorite because of its good size, productiveness and bright scarlet color. The fruit is picked late in September and early in October. The foliage is darker than that of the Early Red.

The McFarlin, an oval dark red berry, is probably the largest late berry grown.

The Gould (named for Dr. Gould, of Cape Cod) is a productive pear berry, of medium season, with a bright purple fruit and light colored foliage.

Lewis is probably the most brilliantly colored of the cranberries. It is a very bright glossy scarlet, medium in season, and pear-like in shape.

Franklin is a comparatively new pear sort, as late as Dennis, purple-red, with a high habit of growth. It appears to have little to recommend it above older sorts.

A new berry which Mr. Makepeace showed me appears to combine more merits than any berry which I have ever seen. Some twelve years ago he observed the original plants in a neighbor's bog, occupying a space about six feet square, and he procured a few cuttings. The small bog which he now has of it is well worth a journey to see. The berries are unusually large, cherry-shaped, a little later than Early Black, and a bright rose-purple. It is probably the largest early berry. It is shown natural size in Fig. 7. I take pleasure in calling it the Makepeace.

It is an arduous labor to subdue a wild bog. The bushes and trees must be removed, roots and all, and it is usually necessary to remove the upper foot or so of the surface in order to get rid of the roots, bushes and undecayed accumulations. This process is termed "turfing." The turf is commonly cut into small squares and hauled off. It is necessary to leave the surface level and even, in order that all the plants may have an equal chance and thereby make an even and continuous bed, and to avoid inequalities in flooding. Although the cranberry thrives in swamps and endures flooding at certain seasons, it nevertheless demands comparative dryness during the growing and fruiting season. The swamp must therefore be drained. Open ditches are cut at intervals of four or five rods, about two feet deep and these lead into the main or flooding ditch. It is also often necessary to run a ditch around the outside of the bog to catch the wash from the banks. The areas enclosed within the intersections of the ditches are called sections, and each section is planted to a single variety. The main ditch is usually a straightened creek, or it carries the overflow from a reservoir which may be built for the purpose of affording water to flood the bog. Growers always divert a creek through the bog if possible. In the Cape Cod districts these creeks are often clear trout brooks. The main ditch is strongly dammed to allow of flooding.

Before planting is done, the bog is sanded. This operation consists in covering the whole surface with about four inches of clean and coarse sand, free from roots and weeds. The chief object of sanding is to prevent too rapid growth and consequent unproductiveness of vines. In wild bogs, the cranberry rarely roots deeply in the muck, but subsists rather in the loose sphagnum moss. Vines that grow in pure muck rarely produce well.

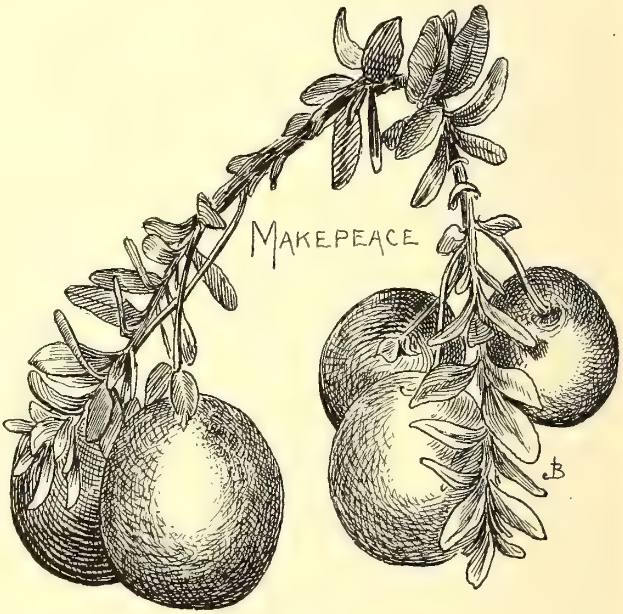


FIG. 7.

The sand also serves as a mulch to the muck, mitigating extremes of drouth and moisture. It also prevents the heaving of the vines in winter, and it aids in subduing weeds. Every four or five years after the bog begins to bear it is necessary to resand it, in order to maintain productiveness. These subsequent applications are light, however, seldom more than a half inch in depth. The Cape Cod bogs are fortunate in their proximity to the sand.

It was once the practice to plant cranberry vincs in "sods," or clumps, just as they are dug from the swamps. There are several vital objections to this operation, and it is now given up. It is expensive, the vines are apt to be old and stunted, an even "stand" can rarely be secured, and many pernicious weeds and bushes are introduced. Cuttings are now used exclusively. These are made from vigorous runners and are six or eight inches in length. They are thrust obliquely through the sand, about an inch and a half or two inches of the tip being allowed to project They are set in early spring, about 14 inches apart each way. In two or three weeks they begin to grow, and in three or four years a full crop is obtained. The subsequent cultivation consists in keeping the bog clean. A small force is employed during the summer months in pulling weeds. Under ordinary conditions it costs from $300 to $500 per acre to fit and plant a bog.

Opinions vary as to the best times and frequency of flooding. There are those who contend that flooding is not necessary, and it is a fact that there are some "dry bogs" which are successful. It is no doubt true that the value of flooding varies with conditions. It appears to be generally held that bogs are longer lived and more productive if judiciously flooded, and it is certainly true that flooding is often the very best remedy for insect attacks. The reasons for flooding, so far as I know, are five: (1) To protect the plants from heaving in the winter; (2) to avoid late spring and early fall frosts; (3) to drown out insects; (4) to protect from drouth; (5) to guard against fire, which sometimes works sad havoc in the muck. Mr. Makepeace prefers to flood but once a year, unless insects appear in serious numbers. He lets on the water in December and draws it off in April or early in May. Just enough water is used to completely cover the vines in all parts of the bog.

There are many hindrances to cranberry growing. The chief are spring and fall frosts, hail, numerous insects and some fungous diseases. During the summer season the bogs are not flooded, and insects must be kept in check by insecticides. Tobacco water is commonly used. Fig. 8 illustrates a tobacco tank about 10 feet long. The liquid is applied with hand pumps from the middle of May to late in June. It is supposed that it has some value as a fertilizer also.

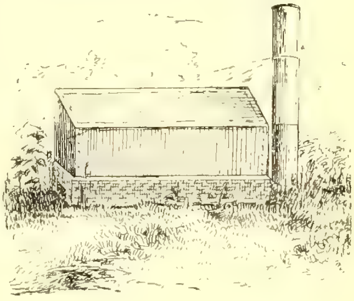


FIG. 8. TOBACCO TANK.

Fifty barrels per acre is a good crop of cranberries, yet 200 barrels have been produced. The grower usually gets from $5 to $10 per barrel of 100 quarts. It does not appear to be known now long a well-handled bog will continue to be profitable, but Mr. Makepeace assures me that he knows a bog 30 years old which is still in good condition.

L. H. BAILEY.

GRAPES IN SOUTHERN INDIANA.

THE following notes upon varieties of grapes and methods of treatment were presented recently at a regular meeting to the Mitchell District Horticultural Society, in southern Indiana, by Mr. J. P. Applegate:

A good market list of grapes for southern Indiana is as follows: *Red*—Brighton, Delaware, Woodruff Red, to which may be added Agawam or Vergennes, or both; *Black*—Moore's Early, Worden, and for those who want grapes without work, the reliable old Concord, which will stand more neglect and bear better than any other kind; *White*—Lady, Martha, Moore's Diamond, Niagara and Pocklington. The prices of plants of some of these kinds have been kept up, but by fall or next spring one-year vines can be procured at reasonable rates. For home use, taste, talent for cultivating, location and length of pocketbook all enter into the matter. The list given for market would also suit most tastes for private use.

On a city lot I have those named above, and in addition, Catawba, Lady Washington, Rebecca, Elvira, Duchess, Prentiss, Salem, August Giant, Early Victor, Empire State, Ives' Seedling, Hartford Prolific, Norton's Virginia, Jefferson and several seedlings. If planting again, however, I should eliminate all but two or three kinds in the different colors. The Martha I name as my favorite grape in flavor, with Pocklington next. Moore's Diamond is a superb grape, and Norton's Virginia deserves a place, as it is very fine if left on the vine as late as possible in the season to avoid freezing; in fact, a slight freeze improves its flavor, if eaten soon afterwards.

It is safer in this latitude to lay the vines down for winter. It is a light job, and pays as well as almost anything that can be done. Even if a vine is permitted to grow and become stiff, it should be bent down until all the young wood is on the ground. It may be necessary in some cases to lay something on a vine to hold it down. A covering of chaff of any kind, well rotted manure or a few shovels of earth is of great advantage in severe winters. Vines that are laid down should be pruned in the fall. That is also a preferable season for pruning, as the weather is generally much better and the ground dryer, making the work more pleasant.

There are many systems of pruning. It should be borne in mind that it is a vine and not a bush that is wanted. For arbor culture in yard or garden the fan system of spreading and spur system of pruning is generally considered the best; bring the shoots from near the ground in the shape of a fan and prune to one and two buds on side shoots. The first season one shoot only is permitted to grow; that is cut back to two buds and the most thrifty left to grow the next season; the third year two or even three shoots may be left, and after that the number must be governed by the strength of the vine, always remembering that the fewer shoots and fewer bunches the vine is called on to mature, the better it can do the work and the hardier the vine and the finer the fruit produced. When the vine is of rampant growth, pinching back in summer is often resorted to and has a tendency to throw more of the strength of the vine into the fruit.

The single stake system is yet largely in vogue, as is the wire trellis, consisting of posts set from twelve to twenty feet apart and from two to three wires stretched as for fencing against cattle; the vines set ten feet apart and rows eight feet. This is a convenient method.

T. V. Munson, of Denison, Texas, has adopted a system which combines more of the beneficial results and fewer of the inconveniences and possible injuries of pruning than any yet devised. Two posts are set in the same hole 2 to 2½ feet deep, 4 feet high and flaring at the top 2 feet; these double posts are planted at intervals of 32 feet and a wire stretched from the top of each. This gives two lines of vines four feet from the ground, making culture easy and the vineyard presenting a handsome appearance. The rows are eight feet apart, the distance in the row depending upon the kind of grapes grown. The pruning is on the renewal system, two vines being permitted to remain for bearing and two others grown for the succeeding year, the bearing vines being removed. This is simple, can be rapidly done and anyone can follow it.

One of the greatest modern improvements in grape culture is bagging. It was first brought to public attention by Col. Bennett H. Young, of Louisville, an enthusiastic and very successful amateur grower, who had at one time one hundred and sixty-five varieties on his home lot. Common two-pound manilla bags, costing about $1.20 per thousand, are used; and are put on usually by girls or women, by pinning over the shoot. With a little practice a quick worker can put on a thousand to fifteen hundred a day. Bagging should be done as soon as the bloom falls. It prevents rot, mildew, keeps off birds and all insects except spiders, and they do little or no harm, gives the berries higher color, preserves the bloom, giving them a much handsomer appearance. Cheap green bags will doubtless soon be in the markets, and then bagging will come into general use, many now objecting to them on account of the odd and very conspicuous appearance of the buff-colored bags on their vines.

COLD GRAPERIES.

I READ with much interest the article by Mr. Williams in the March number of THE AMERICAN GARDEN, advocating glazing cold graperies by leaving the panes of glass a short distance apart instead of lapping, as is usually done. The necessity of so frequently opening and closing the ventilators is thus avoided, and also watering the border by hand, which is so generally neglected by amateurs.

I can say from my own experience, and I have practiced this mode for twelve years, that good grapes can be grown under glass with the roof not water-tight, with the ventilators never fully closed, with no watering save such as comes through the spaces in the roof and an occasional broken pane, and certainly with much less care and attention than is required by the other method.

I have thus grown exotic grapes for many years in a simple lean-to enclosure facing the northwest, which I consider an unfavorable location, and am not troubled with mildew or any insect enemies save occasionally the mealy-bug. I open the ventilators in the spring and seldom change them through the summer, and never fully close them, but keep the door closed and avoid all bottom ventilation, as I find the cold drafts from below are apt to produce mildew. At this date, August 20th, the vines are entirely free from mildew and are carrying a good crop of grapes just beginning to color. The positions of ventilators have not been changed since they were opened in the spring.

In the fall the vines are cut back closely, laid on the ground, and covered with salt hay or any light material to protect them from the heat of the sun. The door and all the ventilators are opened wide and left so all winter, and I have never had a vine winter-killed. In my opinion many vines are ruined by too much attention and by following out some pet theory; in other words, killed by too much kindness. My experience is that the growing of exotic grapes under glass can be made so simple, and the structure built so cheaply, that anyone having some horticultural taste or knowledge can grow as good grapes under a simple lean-to costing but a few dollars as are grown in an elaborate grape-house worth many hundreds, with all the expensive attention usually given in such a structure.

Newark, N. J. CHAS. S. JONES.

PROMISING WILD FRUITS—I.

THE OUTLOOK.

GREAT as has been the progress of pomology in this country within the past fifty years, the people of the United States are still scantily supplied with fruits. The European species, which have been our main dependence hitherto, are only adapted, and that in some cases but imperfectly, to the Atlantic and Pacific slopes and limited portions of the interior. In the greater portion of the fertile prairie belt, extending from the gulf to the British line, and still more in the arid region westward, which comprises nearly one-half the total area of the United States, the successful cultivation of fruit is practically unknown. The whole of this interior region, however, as well as the more fertile borders fed by the waters of the two oceans, abounds with native fruits as full of promise to the intelligent cultivator as any of those from which our well-known fruits of commerce have sprung. Even in the driest and hottest regions along the Mexican border more than a hundred species of cacti are found, a majority of which have edible fruits, some of them of delicious flavor.

The development already made in our native fruits is only a beginning of what the future will show. The improvement of our native grapes, gooseberries, raspberries, etc., has been brought about by the partial or complete failure of foreign varieties; and our increasing population, and the failures in fruit raising, owing to the peculiar climate and soil in the newer states, and to the destruction of the forests in the older sections of the country, will lead to the improvement and cultivation of other native American fruits. Already we see a marked increase in the attention given to our native plums, and the time is probably not far distant when our markets, east as well as west, will be mainly supplied with plums derived from American species. Our cultivated raspberries and blackberries, which have been developed from the wild state within the memory of most of us, are destined to still further improvement. Our wild huckleberries, which are gathered in enormous quantities in some of the northern states, will soon be nearly gone, and then some of them will be brought under cultivation. Our wild cherries have hardly been thought of as subjects for improvement; yet some of them are better than the originals of the cherries we now grow.

No other country is blessed by nature with greater resources in the way of wild fruits than the United States. Had the early settlers who came to this country been prevented from bringing any of the cultivated fruits of Europe with them, and had they relied for their fruits solely on what their intelligence and energy could make of the wild fruits found growing here, it is not improbable that this country, young as it is, would be better supplied with valuable varieties of fruit than it now is. Certain it is that the prolonged effort to cultivate foreign fruits has been the greatest hindrance to the development of our native resources in that direction; and as a rule it is only where the foreign kinds have failed that the possibilities existing in our native species have become known. Whatever shall be made in the future from our remaining wild fruits will depend not so much on the possibilities of each species as on the need of the people for other fruits to meet the requirements of different soils, seasons and purposes.

The beginning of improvement may be seen in almost any of our wild fruits. Professor Asa Gray well observed that "There occur in nature the same kinds of variation as those to which we owe our cultivated fruits, etc.; that such originate not rarely in nature, and develop to a certain extent, enough to show the same cause operating in free as in controlled nature; enough to show the cultivator what he should take in hand." But the improvement of fruits is a slow process, especially at the beginning. It is easier to get along with what we have than to spend time in the doubtful effort to obtain something better. Especially is this true in this country, where so many profitable avenues of labor are open.

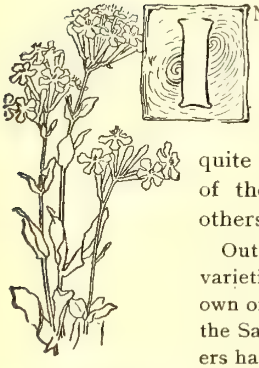
Another cause which now retards the production of new varieties is the systematic propagation and dissemination of established varieties by nurserymen. The modern nursery, with its methods of reaching every portion of the land, renders it no longer necessary for the settler to plant seeds if he would have fruit. For this reason fewer new varieties come into existence now than formerly. Such valuable new varieties as do appear are quickly disseminated, but it is doubtful if there is at present in the United States much more real progress in pomology than a quarter of a century ago.

There has never been anything like the systematic, well directed and protracted effort toward the improvement of fruit that has been exercised in the improvement of domestic animals. There has, also, been lacking suitable standards of excellence by which to establish or condemn new varieties. Indeed, owing to the modifying influence of soil and climate upon varieties, the proper rating of a new fruit is by no means easy. Both the improvement and the testing of new varieties requires a careful and prolonged attention which the individual horticulturist can rarely give. Much is therefore expected in the way of rapid and accurate work from the experiment stations lately established. The assumption by the government of what the people at large have practically abandoned for special lines of industry, will doubtless give an impetus to pomology, of great and far-reaching benefit to the whole people.

Among the promising wild fruits which will be treated in succeeding papers are the crab-apple, plums, cherries, huckleberries and blueberries; some of the rarer blackberries, raspberries and gooseberries; the pawpaw, persimmon, buffalo berry and cacti; and our wild nuts, including the hickories, walnuts, butternut, chestnut, chinquapin and hazel. These will afford a fertile field for investigations that should be of benefit.

Michigan. A. A. CROZIER.

THE SATSUMA ORANGE AGAIN.



IN THE winter of 1882 I planted some seeds of the ordinary sweet orange, and when the young trees from these seeds were large enough I budded up quite a number of them with several of the finest varieties, and amongst others some Satsumas.

Out of several trees of each of these varieties which were transplanted to my own orchard at the same time, none but the Satsumas are now living—all the others have been killed by the cold. These Satsumas, however, have gone through all the freezes that have prevailed since they were planted without suffering any material damage; they have been bearing for several years past, and are not entirely without fruit this year, although the severe freezes of March 3d and 16th froze peach trees half way to the ground within thirty feet of them.

All of these Satsumas bore heavily last year, and one of them, which now has a breadth of top of fourteen feet, had a crop on it that any buyer would have been glad to estimate as low as a box and a half.

We must bear in mind that where the buds are inserted at a height of from one to two feet from the ground (as is often practiced) and the bare trunk of the tree is left exposed to full force of sun and cold, that the budded tree can in such cases be no hardier than the stock upon which it is inserted.

Many people who have Satsumas that have been budded in this improper manner complain that they are not particularly hardy; but if the buds have been inserted close to the ground, so that only the Satsuma stock is exposed, and then after being planted, if this stock is allowed to cover itself with its own growth (as it will do in short order if the lower branches are not cut off as they appear) they will soon be in shape to stand very severe cold; and, as above stated, the Satsumas on my place (budded, and allowed to grow as above described) have so far stood it nobly, while in the case of the numerous other varieties budded in the same manner and at the same time, not a single one lives to tell the tale.

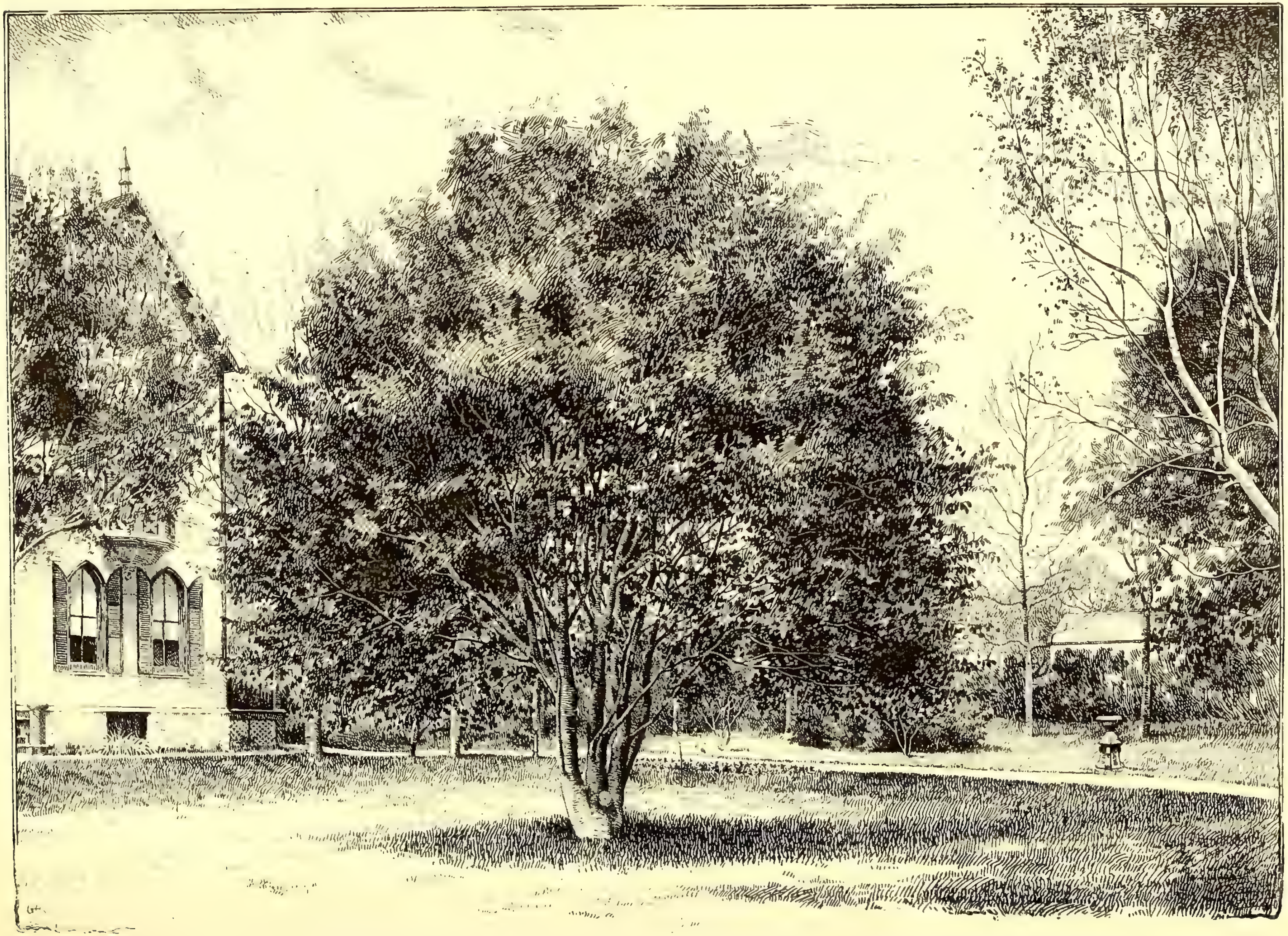
Another point in relation to the Satsumas is that they do much better when budded on sweet stock than they do when worked on sour stock. A very forcible demonstration of this can be seen on the grounds of Major O. P. Rooks, at Fruitland Park, Florida, where orchard trees of this variety, budded on both sweet and sour stocks, are growing side by side; those on sweet stocks are far ahead in the essential points of size, vigor and productiveness.

The Satsuma is an early ripening variety, and is in good eating condition long before the majority of the Florida grown varieties become palatable, and while it may not score as many points (according to any prescribed scale) as some other varieties that ripen later, yet I think it will compare favorably with any that ripen at the same time, which is the only just comparison. In this northern section of the state I am confident it is more valuable than any other variety that we can grow, for it must be borne in mind that in addition to the requisite hardiness of the tree, the orange to be profitably grown here must be an early sort, so that it can be shipped before there is danger of its freezing on the trees.

With due respect to the advice of my friend, Rev. Lyman Phelps, which he says he has a hundred times written to his friends, "You do not want more than half a dozen Satsumas," I will say that I have for several years past wanted more, and planted more than that number annually, and last winter I set out about four hundred of them.

It may be that the Satsuma is better suited to this northern section of the state than to south Florida, and that it makes a more vigorous growth here than there, although this does not seem reasonable; but at all events fifteen by fifteen feet is none too much room to give them here, and at that distance the trees will with good attention touch each other on all sides in six to eight years after being planted.

The freezes of last March were the most destructive of anything I have ever seen in this section; peach trees in many instances lost more than half their tops; Japan persimmons in some cases were frozen to the the ground; leaves of oak trees turned brown and seared as if touched by fire, and in some cases the trees were killed outright; pear trees were nipped back considerably; and Satsuma oranges in nursery suffered more or less in common with other trees, and had their young growth pinched off, but Satsumas three years old or



A Good Purple or Copper Beech; from a Photograph Supplied by Mr. F. W. Bruggerhof. (See page 601.)

more, in orchard, showed actually less damage than peaches, pears, Japan persimmons or oak trees, and, as before stated, are now holding fruit. Of the four hundred trees that were planted in orchard in February (previous to the freezes) not five per cent. were hurt at all. All those whose Satsuma oranges have come through the past freezes in as good condition as mine have cannot but have a good opinion of this variety.

I do not believe that this variety will extend the orange growing section into the central states, but I am sure that in northern Florida, as well as in southern Georgia and throughout the gulf coast region of Alabama, Mississippi, Louisiana and Texas, it will prove to be a very valuable variety, and especially useful for its early ripening and hardiness. G. L. Taber.

Glen St. Mary, Fla.

NEW AND LITTLE KNOWN GREENHOUSE PLANTS.

NOW THAT orchids monopolize practically the whole of the energy and resources of our professional collectors, the introduction of new plants has latterly become more a matter of chance than the result of direct enterprise. The consequence is that the flow of new introductions, other than orchids, into this country has not been, during the past few years, nearly so extensive as it was from twenty to fifty years ago. In these days, however, when almost every corner of the earth has been traversed or is within the ken of some plant-lover or other, the expeditions of specially-equipped collectors are scarcely needed, and from the commercial standpoint have probably ceased to pay.

Some of the best of our newest plants have been obtained from seeds sent by missionaries and travelers in unfrequented localities. A good deal of interest has lately been aroused by the dried specimens and seeds sent to Europe by the French missionary, L'Abbe Delavy, who is stationed in Yunnan, China, and by Dr. Henry from western China. A considerable number of these are rhododendrons, some of which, besides showing characters quite distinct from those of their known congeners, give evidence also of great beauty. Up to the present, so far as I am aware, only one of these, *R. scabrifolium*, has flowered, but numerous young plants of the other species are at Kew, the Jardin des Plantes at Paris, and in some of the trade establishments, where, needless to say, their flowering is eagerly awaited by the cultivators.

Irrespective of orchids, it is probable that quite two-thirds of the new plants that reach England make their first appearance at Kew. The influence and connections of this establishment are world-wide, and its value to horticulture is nowhere better evinced than in furnishing a center to which the numerous plant-lovers scattered through the British dominions may send their discoveries.

Some time ago one of our leading nurserymen observed that the globe was practically played out as regards the supply of new and horticulturally valuable plants, and that it was to the hybridizer and cross-breeder at home more than to the envoy in foreign lands that the gardener must look for new material. So far as applies to new and leading types of plants the first part of this remark appears to be just, for although varieties and species nearly allied to those already in cultivation continue to arrive, the appearance of plants that are strikingly distinct is comparatively rare. It seems doubtful if the days of Fortune and Douglas, the great collectors of the Horticultural Society of London, will ever return, when nearly every week brought forth some new excitement to the horticultural world. If, however, so much of the world is known as to lead us to doubt that there are entirely new races of plants to be discovered, three or four large areas, such as New Guinea, Central Africa and Madagascar are as yet so little opened up that we are justified in hoping they will eventually yield many valuable plants.

One of the most pleasing characteristics of present-day gardening is the revival of the culture of many old and at one time popular plants, which in the conflict with changing fashion had almost or quite disappeared from our gardens, and which to the present generation of gardeners are virtually new. At almost every meeting of the Horticultural Society some of these old favorites make their reappearance. In making a selection of interesting and ornamental plants available for greenhouse cultivation I have not limited myself to absolutely new plants, but have included such as were popular many years ago, and promise as well as deserve to become so again.

Fuchsia triphylla.—Towards the end of the seventeenth century a missionary named Plumier, collecting in the West Indian island of St. Domingo, came across this plant and gave to it the name it now bears. It is a remarkable fact that although it is the species on which the genus is founded, and although one hundred and ninety years have passed since its discovery, it is only two or three years ago that it appeared under cultivation, and it is only this year that its beauty has come to be fully appreciated. In many respects it is one of the finest of fuchsias, the rich and brilliant color of its orange-red flowers being unequalled in that genus. The dark purplish-red tinge on the leaves, especially underneath, also distinguishes it among its fellows. Until quite lately it appeared doubtful if this plant would ever succeed in obtaining a wide footing in gardens, on account of the difficulty experienced in its cultivation.

Under treatment similar to that which produces such a wealth of foliage and flower in the common fuchsias, it does not thrive satisfactorily. It has been found, however, that by allowing it a warmer temperature—one intermediate between that of the greenhouse and stove—it succeeds perfectly. At the Birmingham Botanic Garden there are now plants two feet through—examples of the most robust health—with every one of the numerous branches terminated by a beautiful raceme of the pendent blooms.

Crocosma (Tritonia) aurea.—Two valuable varieties of this old and useful plant have been introduced within the last year and a half. One named *imperialis* is especially valuable. The flowers are almost twice as large as those of the ordinary form, and in color are the brightest orange-red. In size and strength the plant itself is also much superior. Some specimens planted out in a border in the cool succulent house at Kew are over three feet high. The other variety is called *maculata*, on account of the three inner segments of the perianth having a reddish-brown blotch near the base, which adds greatly to the effect. The flowers are much larger than those of the type. It was found in the south-eastern portion of Cape Colony, near Algoa Bay. Like the typical form, both these varieties will probably bear several degrees of frost, but where the winters are especially severe the roots may be taken up in late autumn and stored away until spring. Treated as cool greenhouse plants and given liberal conditions, they prove very effective.

Chironia peduncularis.—Described originally by Dr. Lindley in 1835, this plant appears to have been but little cultivated ever since. It was re-introduced to Kew by seed recently brought from the Cape, and several plants are now flowering very prettily. The easy cultivation of this plant, together with the fact of its flowering for three months in the year, ought to secure it general favor. It is from one to two feet high, with slender, herbaceous branches and light green, sessile leaves. The flowers are very freely produced near the ends of the shoots and measure two inches across; in color they are of a soft rosy lilac. *C. palustris* is a worthy companion of the preceding. It is equally pretty, profuse in flowering and easy to grow, but smaller. It is of compact habit, about a foot high, with rosy purple flowers an inch across. Both species require simple greenhouse treatment.

Mitraria coccinea.—At one time popular, this gesneraceous shrub afterward became quite neglected; now, however, it appears to be regaining its former position. It was discovered in 1848 on Chiloc, an island situated a few miles off the southern extremity of Chili. It is evergreen, of semi-scandent habit, the branches clothed with small box-like leaves. Its flowers are tubular, about 1½ inches long and of the brightest scarlet. It blossoms freely in May and June, and is altogether a most desirable plant. It strikes freely from cuttings, and by pinching in a young state handsome bushes may be obtained. It prefers a peaty soil.

Another plant re-introduced from the same locality is *Crinodendron Hookerii*. Although naturally a tree 15 to 20 feet high in an adult state, it flowers with the greatest freedom when only two feet high. In the warmer parts of this country it has withstood the winters out-of-doors, but it is most satisfactory when treated as a greenhouse subject. The flowers are produced singly or in pairs from the axils of the leaves near the end of the branch. They are pendent, and in shape resemble a large unexpanded flower bud of a fuchsia; the color is a rich, deep scarlet. It thrives on a mixture of light loam, sand and leaf-soil, and is increased by slips.

Boronia heterophylla.—Being dwarf in habit, the boronias are some of the most valuable of greenhouse plants for those whose accommodation is limited. They are of elegant appearance, floriferous, and usually very fragrant. In every point except that of fragrance—in which it is surpassed by *B. megastigma*—*B. heterophylla* takes rank as the finest of all. About nine years ago Miss Marianne North, to whose genius and munificence the gardens at Kew are indebted for a beautiful and invaluable collection of botanical paintings, found this plant in west Australia. She sent seeds to Kew, where they grew and eventually flowered. From Kew it was distributed two or three years ago, and after industrious propagating and exhibition by the trade firms, bids fair to become a popular plant. It is certainly one of the most lovely of recently introduced plants. The flowers are bell-shaped, ½ inch in diameter, and produced in clusters of four to six at each leaf-axil. They are of a rich rosy carmine and pleasantly fragrant.

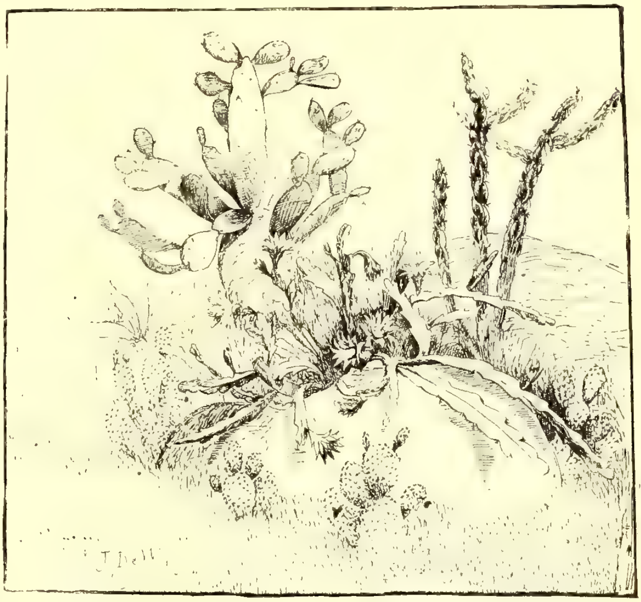


FIG. 1. A CACTUS ROCK-WORK.

Drosera cistiflora.—It is also to Miss North that we are indebted for the introduction of this, the finest of all droseras. The flower is cistus-like, two inches across, with the five concave petals of a bright scarlet. The leaves are two inches long, narrow, and covered with reddish, glandular hairs. The habit is nearest that of *D. Capensis*. As it is quite a beautiful plant and apparently not difficult to grow, it is likely to make a useful addition to the occupants of the greenhouse. It flowered for the first time last year at Kew. It is a native of the Cape.

Passifloras.—Two new kinds, both of hybrid origin, have lately been added to this genus. Fortunately, both are capable of being grown to perfection in the greenhouse. *P. Kewensis* was obtained by crossing *P. kermesina*, a stove species, with *P. cœrulea*. It is of slender, elegant growth and wonderfully profuse in flowering. The flowers are of a bright rosy purple, in structure more suggestive of *P. kermesina* than the other parent, to which, however, the purple coloring is due. For clothing the rafters of houses where light-loving plants are grown, this is better than almost any other passion flower—the majority being of denser growth. The other hybrid was raised in a private garden near Exeter in 1885, and is now being sent out by Messrs. Cannell of Swanley. It has been named "Eynsford Gem," and its parents are *P. racemosa* and the white-flowered variety of *P. cœrulea* called "Constance Elliott." Dr. Masters, our chief authority on the genus, describes it as exceptionally beautiful, "even among a genus famed for good looks." The petals are of a lovely shade of rosy lilac, the threads of the corona being ivory-white, tipped with violet.

Protea nana.—In the earlier decades of the present century proteas were popular plants, as many as twenty-five species being then in cultivation. At present scarcely one-fourth of these are grown, *P. nana* being the prettiest and most delightful. It was brought to Kew from south Africa, and flowered last year. The plant is 1½ feet high, and the numerous branches are clothed with needle-like leaves over an inch long. The flowers are in a composite head, surrounded by several whorls of imbricating scales. These scales constitute the attraction of the plant, the upper ones being large and crimson colored. The flower head is 2½ inches across. The plant should be potted in a peaty soil and given cool greenhouse treatment throughout the year to obtain success.

Eupatorium probum.—This plant, which has for some time been grown in one or two places under various names, was described and named as above by Mr. N. E. Brown. It is a welcome addition to the eupatoriums at present cultivated, being of dwarfer, compact habit and very pretty. The flower-heads are white, and arranged in clusters. It blossoms in spring, and like its allies requires the simplest culture. Each year it should be grown on into 7 or 8-inch pots from cuttings, permitting no check.

Gerbera Jamesoni.—This striking composite was sent to Kew from the Cape in 1888, and flowered here for the first time in June of 1889. Whether it will prove hardy enough to grow outside in such a climate as ours is uncertain, but doubtless it would do so in some of your warmer states. Few plants could be found more lovely. The leaves spring in a tuft from a perennial root-stock, the petioles are six to eight inches long and the blades slightly longer; the latter are four to six inches wide, with the margins unequally lobed and toothed. The flower-head is borne at the end of a scape a foot or more high, and is fully four inches across. The ray-florets are lanceolate and of a brilliant orange-red. The flowers bear considerable resemblance to those of the remarkable climbing composite, *Mutisia decurrens*. All the parts of the plant are covered with soft hairs.

Lilium Henryi.—Last week this lily flowered at Kew for the first time in Europe. It was sent by Dr. Henry from Ichang, in China, and although in its present condition it is inferior to many others, it promises eventually to develop into an elegant plant. The specimen here is nearly three feet high, the stem clothed with lance-shaped leaves and terminated by a single flower. This is three inches long, rich yellow, spotted in the tube with purple-brown. In wild specimens the inflorescence is described as consisting of a corymb of four to eight flowers. It shows some relationship with *L. lancifolium*.

Watsonia iridifolia, var. O'Brienii.—About a year ago this plant was first exhibited in bloom at one of the Horticultural Society's meetings by Mr. J. O'Brien (who had also introduced it), and was awarded a first-class certificate. It is now in flower at Kew, and is indeed a plant of singular beauty. The entire flower is of the purest white, without a speck or tinge of color. A strong spike will measure three feet in height and remain in bloom for several weeks. The watsonias require the protection of an unheated frame, and prefer a rich loamy soil.

Clematis Stanleyi.—Within the last few weeks this species has flowered here for the first time. It is a native of the Transvaal and other parts of south Africa, and is named in honor of the famous traveler. As a clematis it is very distinct. The Kew plants show it to be of herbaceous habit, the stems never reaching more than four feet in height, with deeply cut leaves of various shapes. The plants that have just flowered here are not sufficiently well established to show their full capabilities, but they already give promise of much beauty. The flowers are three inches across, purplish on first opening, afterwards changing to pink and finally almost white. The heads of fruit are described as beautifully silvery.

W. J. BEAN.

Kew, London.

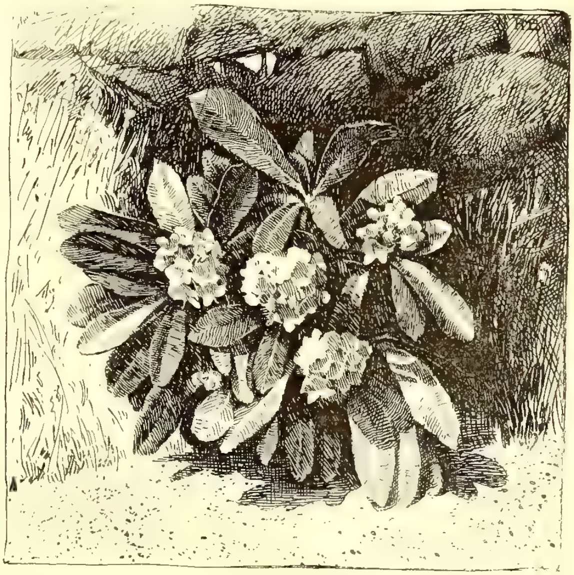
A RHODODENDRON FOREST IN NEW HAMPSHIRE

THE great laurel, *Rhododendron maximum*, which occurs in great abundance in the Alleghany mountains from New York to Georgia, is a rare plant in the New England states. The stations where it is found are few in number, though in some the growth is very profuse. Much as I have botanized in New England, I had never seen the plant till, on July 29, 1890, in company with a merry party from Jaffrey, N. H., I visited the famous forest of this most exquisite shrub, on the farm of S. M. Follansbee, in the town of Fitzwilliam, N. H. We started on a bright afternoon and drove through a most picturesque country, with the grand peak of Mt. Monadnock towering above us.

Fitzwilliam lies in the south-western part of New Hampshire, in Cheshire county, 77 miles from Boston, Mass., on the line of the Fitchburg and Cheshire railroad. The country round about is very rolling and hilly, and this affords most beautiful scenery. Two miles beyond the town, we drew up at Mr. Follansbee's farm and were conducted by the owner through a rocky pasture to a pretty grove of spruces and pines near by. I never had heard any account of these rhododendrons, and I expected to see but a few plants scattered here and there, and so I was in nowise prepared for the glorious spectacle that burst upon me as I passed through the trees that shut the view from my sight. I suddenly saw before me a literal forest of rhododendrons. To me, a beholder for the first time, it was a never-to-be-forgotten sight. I was confronted by a dense mass of evergreen foliage, rising to the height of from 10 to 15 feet, and covering the ground all about us. We entered a pathway cut through this forest and were lost amid the luxuriant growth. Large clusters of rose-colored and white flowers brightened up the dark hue of the leaves, like brilliant gems in a dark setting, We visited but a small part of the ground covered by these plants. They extend over from 12 to 13 acres, not forming one continual growth, but occurring in greater or less density. Those which I visited were growing in a rich, black, peaty loam, over which one could easily walk. Others grow in more swampy ground, while some flourish even on comparatively dry slopes. We were allowed to pick the flowers freely, and we took home with us large bunches.

Can it be that the rhododendron once grew in intermediate stations, connecting this station with its southern habitat? We have similar cases in New England of isolated species persisting far away from their southern or western homes; for example, the *Magnolia glauca* in Magnolia, Mass. The *Rhododendron maximum*, which is closely allied to the mountain laurel, *Kalmia latifolia*, so abundant in eastern North America, is certainly a queen among its relatives of the heath family in the United States. The large, glossy dark green persistent leaves are generally 6 to 8 inches in length, lance-oblong in shape, acute at the end and narrowed at the base. It has a somewhat bell-shaped corolla, very rosy in bud, but whiter when in flower. The stamens, commonly ten in number, and the style are rarely exserted, a character which distinguishes it from the azalea section of the genus rhododendron. The flower clusters are in sessile umbels, the viscid pedicels being little more than an inch in length.

I cull the following from information furnished me by Mr. Follansbee, who sells young plants of this shrub to fanciers. The rhododendron thrives best in masses, rather than in single specimens, and prefers a sandy, peaty soil, though any good, light, sandy loam answers very well. A clayey loam or limestone soil should be carefully avoided. The plants are easy to transplant, the best times being from April to June and from August to December. A cool and moist locality, with deep soil, is preferable, and the plant should not be exposed to the severe winter winds, which shake the foliage about, covered with ice and snow, often stripping off the leaves, so essential in their perfection to the beauty of the plant: hence, as mentioned above, it



A Cluster of Rhododendron Maximum.

flourishes much better when growing in masses, and makes a brilliant show when so grouped.

Careful pruning prevents the plants from becoming long and straggling, August being the best time. When the plants are out of flower, propagating may be effected by grafting and by layers. By the latter method a few of the lower branches are pegged down to the soil, and they may be removed and transplanted the second year. One plant was introduced years ago into Great Britain, where it flourished in great luxuriance. By hybridizing it with an Asiatic species, which has far more brilliancy of color than our own, but is not hardy, a variety has been obtained combining the two very important characteristics of hardiness and gorgeous display of flowers, thus making the rhododendron a most valuable acquisition to our garden shrubs, and justifying the great attention given it in Europe.

Walter Deane.

HARDY CACTUSES IN THE OPEN GROUND.

THE illustrations (Figs. 1, 2 and 3), drawn from nature, represent beds on a country place near Cornwall, Orange county, New York, and show an interesting ornamental device. The rocks are entirely artificial in their arrangement, being brought from the mountain side on the place to hide a wall which occupies a most conspicuous position near the entrance.

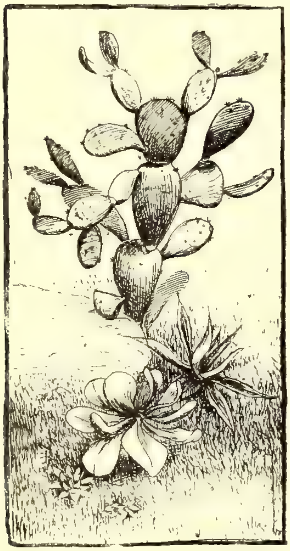


Fig. 2. An Opuntia Well Placed.

These rocks form, by their roughness, a most agreeable contrast to the smooth lawn seen beside them; and although picturesque in shape, and covered with lichens and mosses, they differ in no way from the stones that abound in the region. The most interesting particular about the rocks is a growth of the common hardy cactuses (*Opuntia vulgaris*) that thrives upon them. A few sods were placed in two of the crevices near the top of the rocks, and pieces of the prickly pear planted in them three years ago. The dryness and exposure soon killed the grass, but the season being favorable the cactuses grew wonderfully, and since then have produced a brilliant show of yellow flowers every year, besides displaying their quaint growth at all seasons. Visitors rarely fail to remark them, and the majority are astonished to learn that they thrive without protection in a climate so severe. They are subjected to a heat in summer often exceeding 100° Fahrenheit, and in winter, to a temperature as low as 10° below zero; still they never looked better than now. As cold weather approaches the plants shrivel and turn brown, falling flat upon the rocks, and no form of vegetation has a more dead and miserable appearance; bnt when the warmth of spring revives them, they again absorb moisture and become a brilliant green, lifting their outer lobes erect, or spreading further upon the rocks.

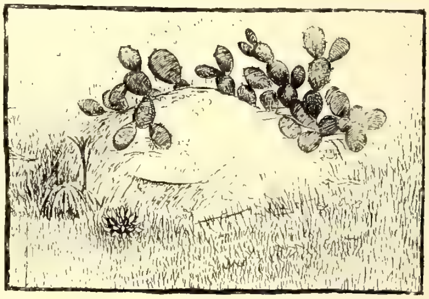


Fig. 3. A Rock Vignette.

An interesting bed can often be made by grouping cactuses about some central object on a lawn, in an irregular way. This arrangement is usually more admired than strictly geometrical forms. It is better not to remove the plants from the pots, as the latter can easily be buried out of sight. There is less work about this kind of a bed than any that can be made; the result, however, is largely dependent upon the beauty of the individual plants, and the taste employed in arranging them. The plants should be of good size, and sufficiently abundant to make their peculiarities effective. Flowers destroy the symmetry of a regular bed, but in one of this kind their presence, in greater or less abundance, is always welcomed. A dry and open situation is to be preferred; and a spot where nothing else will grow, can often be covered in this manner and made most attractive, without doing violence to that harmony which should govern ornamental planting.

J. DeWolf.

* * *

SOME ATTRACTIVE NATIVE PLANTS.

The Flowering Wintergreen or Fringed Polygala.—In the latter part of May one frequently finds in moist woods, or near the banks of shady streams, the beautiful fringed polygala (*Polygala paucifolia*) shown in Fig. 1. It is the cheeriest, brightest little flower of its season, and might readily be mistaken for an orchid, or a member of the pea family, though it is of widely different structure from either, belonging, as it does, to the milkworts. This charming little plant is exceedingly beautiful and interesting, and should be oftener cultivated by those who are able to furnish it with a congenial home. The stems are simple, erect, three or four inches long, and grow from long, underground shoots that bear the fertile flowers; and it is these which, concealed in the soil, produce most of the seed. As will be seen by our illustration, the lower leaves are few and small, while the upper ones are petioled and crowded at the top of the stem. The flowers may be called large when the diminutive size of the plant is considered. They are about an inch long, of a delicate shade of bright rosy-purple, rarely white.

The calyx consists of five sepals. The odd one is superior and the wings are like petals. The stamens, six to eight, are combined into a tube split on the upper side and united below with the claws of the petals. The ovary is two-celled, each cell bearing a single ovule, the entire fruit being heart-shaped. The plant in our illustration is reduced about one-half; the flower is nearly of the natural size.—E. S. Carman, *N. J.*

Yellow Lady Slipper.—Who that has lived in the country has not seen and admired the fairy moccasins that might have been worn by some dusky Cinderella of the past, when the Indian roamed unrestrained and unpersecuted over the western prairies?

A few years ago a certain meadow in Tama county, Iowa, abounded with these little orchids (*Cypripedium pubesceus*). (Fig. 2.) Now not a single one is to be found. They can, however, be cultivated, requiring a rather cool and damp situation. The blossoms of this species are large and yellow, with a very conspicuous "slipper." Five or six other species are known, all pretty and worthy of cultivation.

No one who has an eye for the beautiful can help admiring the waxy lady slippers, the pretty grass pink (*Calopogon pulchellus*), the rare calypso, the handsome wild orchis (*Orchis spectabilis*), the lovely yellow-fringed *Habenaria ciliaris*, the purple-fringed *Habenaria psycodes* and the superb large, purple-fringed *Habenaria fimbriata*, allbelonging to the orchidaceæ.

Puccoon or Indian Paint.—*Lithospermum canescens* (Fig. 3). This interesting plant grows on the prairies in the eastern, middle and western states. When its native haunts are converted into fields, it still flourishes along the road-sides. The pretty orange-yellow flowers are borne in one-sided racemes, sometimes three or more to a single stalk. The leaves are small, oblong and covered with silky hairs.

The root is often several feet in length, dark brownish red on the outside, with a light center and dark veins which, when bruised, emit a bright pinkish red fluid, which is sometimes used in coloring, especially by the school children, whose cheeks and fingers often bear evidence of having been in contact with "Indian paint." From each of these perennial roots spring one or several stalks which, with their pretty, bright blossoms and small, neat leaves, form a very attractive cluster. It should be known in cultivation, and is worth the improver's study.—Walter A. Lynn, *Iowa.*

Rattlesnake Plantain.—I have a goodyera which was brought to me in the winter of 1888-9 from the woods, its bright evergreen leaves, curiously netted with white, having attracted attention from contrast with its gloomy surroundings. As a quantity of the leaf-mould was brought with it, I had no difficulty in reconciling it to its new home, and it has been a source of real pleasure to me the winter through.

Last year I noted with interest the way in which each new leaf came out, apparently growing from the center of the last one, in a manner quite different from the growth of anything else I had ever seen. The leaves are all radical, so when I at last discovered a slender

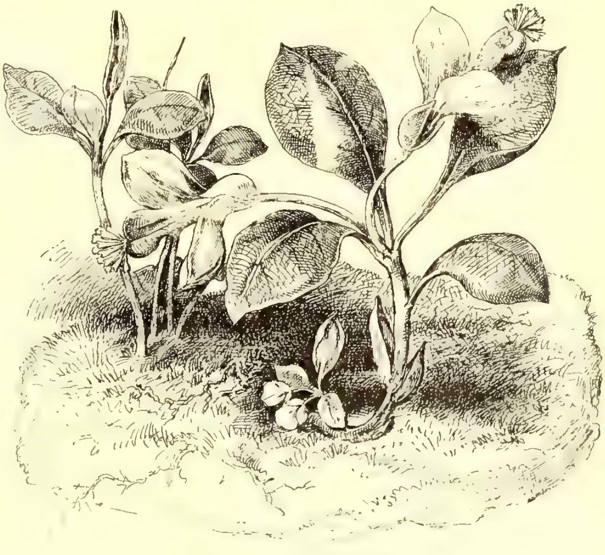


Fig. 1. Polygala paucifolia.

stalk pushing up from the center of the plant, I hailed it as a token of blossoms. I watched its growth with increasing interest, as the woolly peduncle stretched higher and higher, putting out occasionally a tiny green bract.

It grew very slowly, the promise of buds being at last realized in a dense spike about an inch and a half long, the buds on which began to burst into bloom shortly before the middle of June. There were 42 buds and flowers alternating with each other upon the downy spike. They also were somewhat pubescent, a characteristic which serves to designate my species, together with the fact that my plant bears its flowers quite around the spike, while the other two species bear theirs only on one side.

Mine is the *Goodyera pubescens*, a curious and interesting plant. The tiny white flowers showed their orchidaceous characteristics. The upper sepals and petals were vaulted, the two lower sepals surrounding the globular lip with its short recurved tip. The anthers were borne on a filament attached to the back of the column. By the aid of a glass I could see that the pollen grains were angular in form.

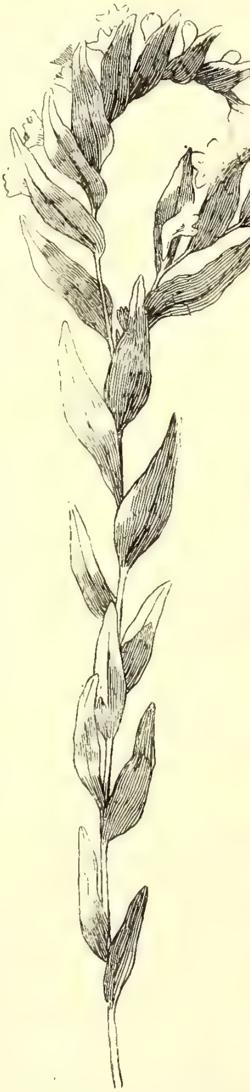


Fig. 3. Lithospermum canescens. (Red Root; Puccoon; Indian Paint.)

The books put the time for the flowering of this species as far advanced in the season as July or August, but mine came into bloom on June 13. Perhaps cultivation hastened its maturity, the botanist may say. However that may be, I am quite well satisfied with the pleasant results of my care.—Susie E. Kennedy, *R. I.*

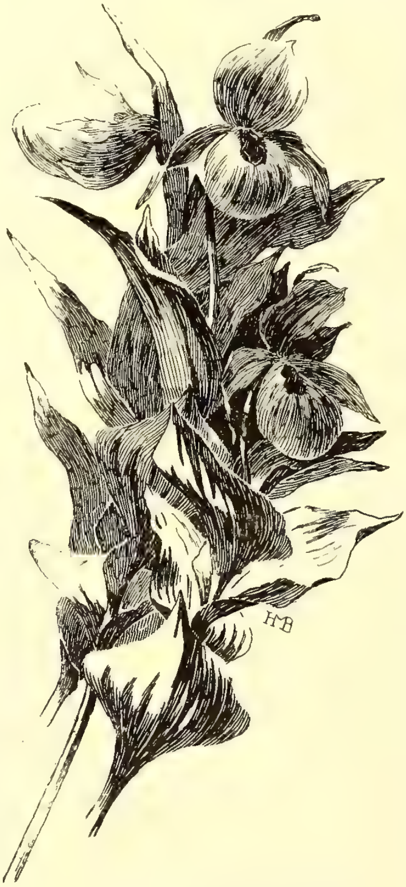


Fig. 2. Cypripedium. (Indian Moccasin; Lady Slipper.)

The Medeola or Indian Cucumber-Root described on page 420, in the July issue of the Garden, is an attractive plant of rich woods which merits greater attention than it has yet received. Wild flowers are quite as interesting from their curiousness as from the beauty of their flowers, and the cucumber-root belongs to this class. It is a slender perennial herb, one of the lily family, ranging from New England to Minnesota and southward.

The Spotted Wintergreen, *Chimaphila maculata*, is another plant of peculiar interest which is not generally known (Fig. 4). It is a low herb, inhabiting deep woods throughout the states east of the Mississippi, although it nowhere appears to be common. The flowering period in the north is in June and July. It is one of the heath family, and is closely related to the true wintergreen or checkerberry. The flowers are white or rose-white, borne two to five together on the slender peduncle. The leaves are dark glossy green, with conspicuous white variegations, and they persist through the winter. Another species, *Chimaphila umbellata*, known as prince's pine and pipsissewa, grows in dryer open woods and banks.

Snow-Plant. Closely allied to the chimaphillas is the remarkable *Sarcodes sanguinea*, or snow-plant of the Sierra Nevadas (Fig. 5). It is a low and fleshy plant, growing from three to twelve inches high, and entirely devoid of true leaves. It belongs to that strange group of the heath family which comprises the fleshy and parasitic plants, of which our Indian-pipe or corpse-plant is an example. Few species are known in this sub-order, and they are all local or rare.

The snow-plant was first discovered by one of Frémont's expeditions in the valley of the Sacramento. It was described by Dr. John Torrey in 1854 in the sixth volume of Smithsonian Contributions, along with several other new genera which had been discovered by the Pathfinder

Among these genera, Fremontia, Carpenteria and Spraguea are familiar to cultivators. The generic name of the snow-plant, *Sarcodes*, means "flesh-like," and the specific name, *sanguinea*, refers to the blood-red color of the entire plant. It derives its vernacular name of snow-plant from its habit of shooting up and blooming as soon as the snow melts away in spring. The plant occurs only in the Sierra Nevadas of California, at an elevation of from 4,000 to 9,000 feet. There is only the one species known.

L. H. B.

FORETASTES OF PARADISE.

THE AUTUMN AND THE SPRINGTIME—THE BLISSFUL DAYS IN GARDENS AND FIELDS.

IT WOULD seem to be one of the kindly provisions of nature that, at the very time when, if ever, she may be said to be depressing by reason of the outward semblance of death and mourning which she wears, the minds of those of her lovers who delight in gardening are distracted from gloomy autumnal thoughts by visions of a resurrection of beauty in the coming spring. For who that has loved and tended a garden, does not dream of its possibilities another year as soon as the frost and winds begin to dull its brightness? The cool, invigorating air, the bright sunshine of these autumn days, invite one irresistibly out of doors; and standing over her desolate flower-beds, the mistress of the place (who, let us take it for granted, is her own head-gardener) plans her little plot of ground anew, and finds a partial solace for her losses in studying how best to repair them.

When one considers not only the delight and benefit to be derived from work in the open air at this season, but also how much success depends upon it, it is surprising that so few amateur gardeners attempt it. The argument that fully one year's time is saved by planting shrubs and nearly all hardy plants in the autumn would be sufficient, one would think, to drive every Phyllis to her trowel. The action of the frost on the upturned soil in the borders will make them doubly productive another summer; moreover, certain plants, such as irises, lilies and pæonies, which, if set out in the spring, will not bloom the same year, yield an abundance of blossoms if planted in the fall.

The beds and borders being deeply and loosely spaded and well enriched, the next thing to be done, obviously, is to decide upon what to put in them. Judging from the way most gardens are made, this can not be a very perplexing question. That it is one which deserves much more thought and consideration than it receives, no one will dispute who has noted the poverty of ideas, the monotony of arrangement in the gardens of suburban and many village homes—a star monogram, or motto of variegated colors, a round bed of scarlet geranium, encircled with alyssum, perhaps, or, quite as often, a sort of crazy-quilt border, in which plants of endless variety crowd each other without the slightest regard for form, harmony of colors and general effect. This is the type of garden that is to be seen a hundred times during a drive through the suburbs of any large American city. Strangely enough, these geometric designs and hodge-podge flower-borders are found very often about the homes of women of refinement, disciples of Burne-Jones and Oscar Wilde in matters of interior decoration, but followers of some ignorant, color-blind gardener of a by-gone generation, who invented the ribbon-bedding system of spoiling lawns.

By all means let the gardens abound with hardy flowers. A small investment in a well-selected stock of plants that will endure our northern winters pays a compound interest year after year in constantly increasing loveliness and beauty, and what a pleasure to hunt for the first peep above ground of our old favorites as soon as the snow is gone! It is but a transient love, after all, that we have for the tender annuals, lying limp and black after the first frost. The hardy flowers take root more deeply in our affections after a well-tested friendship through fair and stormy weather, and finally become as much a fixed part of the home as the pillars to the porch or the books on the library shelves.

"Infinite riches in a little room" might well refer to these curious sacks of spring-flowering bulbs, which are exported in such quantities from Holland. At least one of these sacks should find its way to every garden, however small. Its treasures are inexhaustible and inexpensive. Snow-drops and scillas that bloom before the first robin has come, surprising one with the news that spring is already here, in spite of bleak winds and gray skies; crocuses "of shades," as the Dutch catalogue describes them; tulips, "a host of yellow daffodils," narcissus in many exquisite varieties, hyacinths and sweet-scented jonquils—these must all be planted in the autumn before the ground is too much frozen to be easily worked. The ordinary garden soil, well-drained, suits these flowers admirably, a little sand sprinkled around each bulb being the only needful addition to it. It need scarcely be said that these flowers—and the rule has but few exceptions—are most effective when planted each kind by itself. A bed of large yellow crocuses in the April sunshine looks like a mound of molten gold, or the famous dome of Boston's state house, and what could be more dazzlingly gorgeous than tulips in a mass? Even the proverbially bad taste of the Dutchman does not extend to mingling other flowers with his beloved tulips.

Before the last of the Dutch bulbs are in the ground, it is well to set out irises, which follow them into bloom so closely in the spring. The chances are they will flower the next season. And what a royal show they make! It is quite possible to form a garden of them exclusively; indeed, a certain college professor devoted his small door-yard to them alone, growing sixty varieties in a plot of ground ten by fourteen feet, and certainly no other garden in the town excited so much admiration. Though the Japanese iris has the most wonderful coloring and form, the German and Spanish varieties, which are smaller, and for that reason excellent to fill in with, should not be overlooked in one's enthusiasm for the Kæmpferi species. One of the secrets of artistic gardening lies in surrounding tall-growing plants with low ones, to make them stand out boldly and effectively.

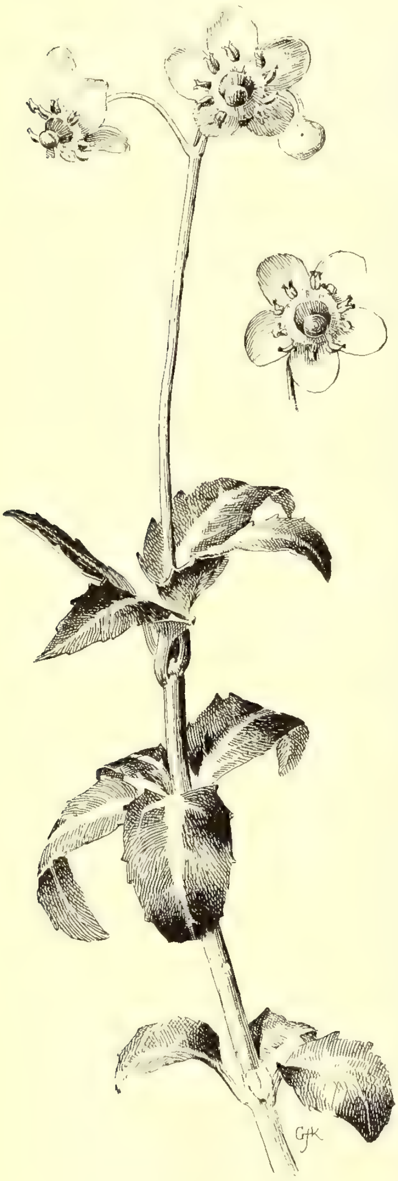


FIG. 4. CHIMAPHILA MACULATA.

In the border, where there is partial shade, yet where no roots from the trees impoverish the soil, plant the hardy lilies from September 1st as long as the soil can be worked, and if the day be a dismal one, "the saddest of the year," be cheered by a vision of white and gold sweet-scented bells, swaying in the breezes of the coming summer. The magnificent auratum lily, grown behind some low-growing shrub or plant that will partly conceal its very tall stem; the exquisite, pure white candidum, which, by the way, should be the first lily planted in September; the brilliant little turk's cap that grows wild in many fields, lilies-of-the-valley, the old-fashioned day lily, the light buff excelsum—so runs a list that offers glimpses of Paradise from June till October.

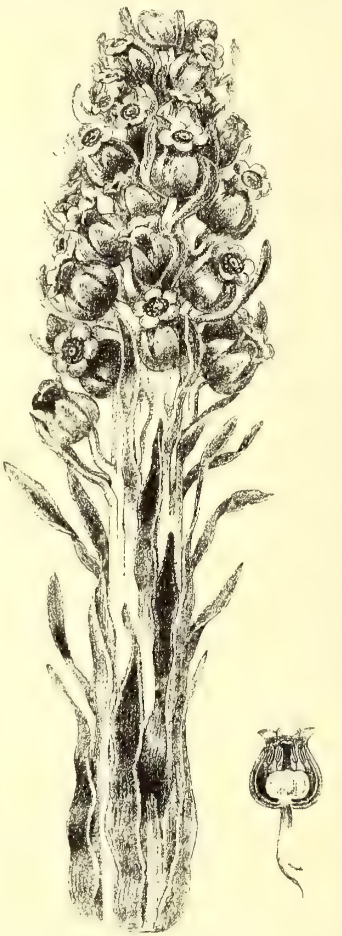


FIG. 5. SARCODES SANGUINEA.

By far the most time devoted to fall gardening is spent in putting the bulbs into the ground, but there are many shrubs and plants which may be set out now with advantage in our northern latitude, provided they are planted early enough to insure new roots forming before hard frost. As growth ceases in a temperature lower than 40°, the thermometer is the best guide in all localities for the novice gardener to consult. No garden rules yet found would apply equally well to Maine and Virginia, or to New York state and California. A little observation and experimenting on one's own account are worth more than any printed advice, besides adding interest and zest to one's work.

A fernery out of doors forms one of the chief delights in the hardy garden—a cool, delicious, retreat in mid-summer, a never-failing source of supply for bouquets and the jardiniére, and not least among its many virtues, it may be said to fairly take care of itself when once established. For beginners the autumn is the best time to collect ferns from the woods. It is then near their dormant season, yet the fronds are not so dry that the various species may not be easily distinguished. Notwithstanding a popular tradition to the contrary, ferns are easily transplanted, provided they are lifted at the proper season. When dormant, they have been brought across the Atlantic in a hand-bag with perfect success; carried in the crown of a lady's bonnet from the mountains to her home, a distance of over five hundred miles, slowly traversed; and at another time a clump of them flourished after six weeks of almost constant knocking about, packed between two old overshoes in the bottom of a Saratoga trunk.

Whichever ferns grow well about your neighborhood may be relied upon to thrive in your garden in a loose, light soil enriched with leaf mould, peeped at by the sun for a few moments daily and watered occasionally with a fine spray, if the weather be very dry. A shady and sheltered position is best chosen for the hardy fernery. The wind that snaps the fronds and parches the ground must be avoided as well as the noon-day sun. Under favorable conditions the ostrich, the sensitive and the cinnamon ferns, the common brake in several varieties, many aspidiums or shield ferns with their finally serrated plumes, the maiden-hair and the diminutive polypody may be made to thrive as vigorously in the shadow of your house as they did in their native glens. In no other part of the garden may so many souvenirs of pleasant travels be treasured up as in the fernery—not least among the reasons for its existence. The thriving fern-bed suggests the possibility of a nook in the garden where wild flowers will tangle with the delightful unconscious grace they wear in fields, woods and road-sides. How enchanting a reality, but how hopeless, you say, to think of transplanting a bit of forest to one's own door-yard! An anemone would surely never survive its first glimpse of a mowing machine, and who could reasonably expect to find arbutus trailing its sweet self over ground sold at so much a front foot!

But let the skeptical novice take up "Mary's Meadow," or "Letters from a Little Garden," remembering that Mrs. Ewing's knowledge wherefrom she wrote was, for the most part, gleaned in transforming the barren, neglected grounds about a soldier's barrack into a "Parkinson's Paradise." Let her make an excursion to the nearest woods while the first flush of enthusiasm lasts and dig up generous clumps of violets—purple, yellow and white; anemones, hepaticas, bloodroot, wake-robins, wild azaleas, jacks-in-the-pulpit, arbutus, partridge-berry and wintergreen vines, golden rod, mountain laurel and rhododendron, the feathery clematis, columbines, sweet-briar, azaleas, wild honeysuckles, blue flag and whatever else tempts her, rejecting nothing because it looks wild and frail. So far from any of these plants just mentioned not doing as well in a garden as in their natural homes, they are individually known to improve under ordinary cultivation. Even arbutus increases and blossoms abundantly year after year about the roots of a certain bed of rhododendrons, which supply it, apparently, with every needful condition.

Nearly all wild flowers require a light soil, plentifully enriched with leaf-mould, and demand, especially, that their roots be kept cool. In the dense shade of the woods, plants rarely suffer from droughts, but in gardens the rapid evaporation of dew and rain is to be guarded against by laying small flat rocks among the roots of the flowers. Given light, air and sunshine for the leaves, and rich, cool soil for the roots to spread themselves in, and few wild plants, unless especially exacting, will miss their native nooks. Florists say many house-plants die, not because the leaves and stalks are unable to endure the hot and dry air of our living rooms, but because the pots in which they are confined, taking on the temperature about them, slowly bake the rootlets clinging to their sides. If the pots were plunged in larger pots or boxes of moist saw-dust or sand, our rubber plants and palms might imagine themselves in a tropical forest and grow accordingly.

There are, of course, many beautiful flowers which die annually that every one wants in her garden; sweet peas, mignonette, pansies, heliotrope and nasturtiums, for example, and it is well to plan spaces for them now, though their blossoms seem so far off, because with the woods to draw from, there is danger of their being crowded out. But the nearer one comes to having a hardy garden entire, the nearer perfection it will be from the practical, artistic and poetical stand points, but not from your gardener's point of view—you must be prepared for withering blasts of scorn from that quarter. Can any one imagine a lovely painting with a geometrical flower-bed in the foreground, or think of a poet rhapsodising in a sonnet "To A Well-Sheared Coleus Star?" The hardy garden has other advantages, however, besides its permanence, its faculty of taking care of itself, its greater artistic beauty, or its wealth of mementoes of travel and friendships. "A garden of hardy flowers," writes Mrs. Ewing to her "little friend," is "pre-eminently a garden for cut-flowers. You must carefully count this among its merits, because if a constant and undimmed blaze outside were the one virtue of a flower-garden, upholders of the bedding-out system would now and then have the advantage of us. For my own part, I am prepared to say that I want my flowers quite as much for the house as the garden, and so, I suspect, do most women."

MRS. R. H. GRAY.

THE PURPLE BEECH.

OUR illustration, page 591, shows a good specimen of the purple or copper beech growing upon the grounds of F. W. Bruggerhof (of the firm of J. M. Thorburn & Co.), at Stamford, Ct. The purple beech is one of the most satisfactory of all purple-leaved trees because of the permanence of its character, and the fact that the tree possesses other merits than mere color. All the purple-leaved trees change color more or less during the season, and the copper beech is no exception to the rule. Yet even in mid-summer it retains a dark and rich foliage quite unlike that of its parent, the European beech, or its American congener. It is said that the tree thrives best and holds its color best along the seaboard, and it is certainly true that the finest specimens are to be found in that section; but this may be due to the fact that they were earliest planted about the easternmost cities, and have attained sufficient age to show their full beauties. But we have seen fine specimens in the nurseries of western New York, some of them as large and good as the one shown in the illustration.

The purple beech varies much in color, especially when grown from seed. There is a most remarkable example of this in a copse of these trees attached to one of the old nurseries in Geneva, N. Y. In the spring this plantation presents a wonderful combination and variation of color.

CALIFORNIA TRUCK-GARDENING.

ABOUT half a mile from where I write is a piece of sandy soil near the Alameda creek. Twenty years ago it was considered too poor for anything but pasture. Now it is worked by several Italian gardeners who supply this part of the valley, and are growing rich from less than five acres of land, for which they pay a yearly rental of $150. They irrigate constantly, and use an enormous amount of stable-manure, as all successful truck-gardeners do, but the especial feature of their system that would interest a man from the Atlantic states is that they use every inch of their land for every day of the year. As in Italy, or Spain, the climate is always in their favor. I should hesitate to say what this land is worth as they use it—it supports five men, and two families. Across the lane is a tract of twenty acres of rather better land, farmed by an old-time agriculturist, who gets one crop a year. This season he had, on twenty acres, about $150 worth of hay, above expenses, or not more than the rental value of the smaller tract.

The development of the truck-farming business of late years in California has been quite as remarkable as that of the orchard and vineyard interests, but, strange to say, one hears very little about it. As a shipping industry, it is, of course, in winter-grown vegetables that the bulk of the increase has occurred.

I can best illustrate the ordinary condition of the San Francisco winter markets, to which all the earliest districts are tributary, by copying from my note-book a list made at the time that the great snow storm in the Sierras blockaded all the trains: endive, leeks, kohl rabi, spinach, asparagus, green peas, string beans, cucumbers, lettuce, artichokes, tomatoes, salsify, celery, cauliflower, Brussels sprouts, cabbages, new potatoes, sweet potatoes, rhubarb, young onions, turnips, radishes, cress, fresh okra, parsley, kale—all grown in the open air. Peas and string beans are in market every day in the year.

Carloads of vegetables are shipped to the mining camps of the Rockies, and to Chicago, but the business is as yet only in its infancy. Last year the railroads carried about fifty million pounds of vegetables out of California. Judging from the feeling in the leading vegetable districts, five years will see this output trebled. Capital is taking hold of the business, and while it is especially attractive to foot-hill farmers and colonists, some large tracts in the valley near San Francisco are considered worth more in vegetables than in orchards.

The first ripe tomatoes that I saw in San Francisco this year were from the Los Angeles region, and sold for forty cents a pound. Vacaville sends the best of the early tomatoes, as a rule, and the best early cucumbers. There are a great many places in the California foot-hills as far north as Red Bluffs where strawberries ripen in the open air all winter, where red peppers keep on blooming and ripening, and where water-melon vines grow without ceasing. I have seen all the leading sorts of vegetables grown in the open air in December and January in various places in Shasta, Tehama, Butte, El Dorado, Placer, Solano, Santa Clara, Alameda, and many other northern and central counties, as well as in the famous counties of the southern end of the state. By April cartloads of peas and tomatoes can be gathered; by May string beans are abundant. A letter from Los Angeles says:

"From the first of December to the end of April cauliflower, celery and cabbage should be shipped from here by the hundred tons. From the 1st of April to the end of June tomatoes, green peas, new potatoes and string beans ought to be shipped." The same is true of the warm slopes of the Santa Cruz coast range and the Mission Peak and Livermore districts, where, if necessary, ten thousand acres could be planted in early vegetables.

A truck-farmer near Oroville has lately printed a statement of his operations. He employs fourteen men on forty acres, planted in orchard and vegetables. The crop of 1889 was as follows:

"Peaches, eighty tons; apples, twelve tons; pears, three tons; apricots, ten tons; nectarines, ten tons; plums, four tons; blackberries, ten tons; raspberries, one and a half tons; strawberries, two and a half tons;

grapes, twenty tons; quinces, two and a half tons; cherries, two tons; figs, one ton; potatoes, thirty tons; onions, twenty-five tons; cabbage, twenty tons; cauliflower, one and a half tons; carrots, five tons; parsnips, five tons; beets, three tons; sweet-potatoes, four tons; water-melons, a hundred tons; musk-melons, twenty-five tons; cucumbers, two and a half tons; peas, three tons; beans, four tons; turnips, seven tons; rutabagas, two tons; green corn, ten tons; squash and pumpkins, four tons; tomatoes, forty tons; green peppers and okra, half a ton; lettuce, spinach, radishes, celery, asparagus and artichokes, ten tons in all."

The most noted truck-gardening ever done in California was in pioneer days, when one man made $40,000 in one season out of water-melons, and another cleared $160,000 on potatoes, corn, beans, cabbages, etc., which brought enormous prices in the mines. Potatoes being worth $50 a sack, every valley farmer planted them the next year, and thousands of sackfulls rotted in the field, not being worth the digging. The largest crops of potatoes now grown in California come from the reclaimed tule lands. The best in point of quality are from the rich mountain valleys. As high as two hundred and fifty sacks, weighing about thirteen tons, are sometimes obtained from an acre. In Humboldt county, last year, four hundred and ninety tons were dug from forty-five acres of bottom land that had not been cropped for years, and had never received any fertilizers whatever. The Colorado potato-beetle has never been seen in California, and potato rot is extremely rare. The only disease known, and that at long intervals and on limited areas, is the potato blight.

Of late years, the "early districts" are being planted extensively to "new potatoes," which are more and more in demand. In Alameda county, last year, a Portuguese truck-farmer rented hill land at $5 an acre, and cleared, I am told, nearly $200 an acre in "early potatoes." The experiment of shipping to New York will probably be tried next year.

Beans are becoming one of the most notable of California crops. It takes fourteen hundred freight cars to carry the bean surplus east, and the state undoubtedly leads all others in the Union, not merely in the famous Lima bean, but in all other kinds also. The "bean-belt" begins in the warmer portions of Alameda and Santa Clara, and becomes important in Monterey; but San Luis Obispo, Ventura and Santa Barbara are the centers of the industry. The total bean output of the state is about forty million pounds, worth fully a million dollars in the field. The requisites of a bean farm are a rich soil, and a climate that ripens the beans up evenly, so as to get the largest possible crop. Lima beans last year paid the grower from $100 to $250 per acre, and as a Santa Paula correspondent recently wrote of the Ventura country: "Bean planters, bean hoes, bean cutters, bean pullers, bean threshers, bean cleaners, bean buyers, bean experts, bean agents and bean-patch mashers—mighty is bean down this way! The bean industry in this section has reached proportions little expected a few years ago, and to-day your correspondent finds families comfortably situated and well-to-do, who came here, only yesterday, as it were, flat broke, and they have demonstrated that any industrious family can 'get there' on a small farm by cultivating beans"

A California Squash Field.

At the present time the chief products from tomato culture are from the very early crop. The "main crop" is often worthless and decays on the vines. The excellence of the tomatoes, as grown in our rainless summers, is unquestionable. During the past three or four years the tomato seed industry has become important, but a small acreage will supply the demand for that purpose. In Los Angeles, the growers sell to canners at $8 a ton; in Santa Clara the price is but $6, the fruit to be picked and delivered. If even this very low price could be maintained, however, an unlimited supply might be furnished with profit to the growers, so large is the yield; but the canneries are often glutted, and the quotations are but nominal.

The beet sugar factories promise large results. J. B. Hudson, of Watsonville, last year grew 8,417 pounds of sugar per acre on a tract of ten acres, and won a prize of $500 from Mr. Claus Spreckles. From a thousand acres cultivated in this district, fifteen thousand tons of beets were dug, for which the farmer received $5.25 per ton. Some of the beets yielded over 20 per cent. of sugar. No crop is more important, in view of the great and increasing demands of the canners for a cheap and good sugar, and even the free traders in California desire the beet sugar industry to have a chance to get under way. Table beets are grown all the year round, and are one of the cheapest vegetables in the markets.

Among the vegetables that are abundant and cheap in California the egg-plant deserves mention. The fruit, as seen in the market is often from eight to ten inches in diameter, and of most excellent quality. The cauliflower is extremely abundant. Watermelons are often "on hand" for Thanksgiving, and sometimes even for a New Year's dinner. Sweet corn continues from early spring to November. Carrots and beets are grown for cattle-feed, and generally stay in the field until wanted for use. Turnips are not a field crop, except in some of the northern coast counties.

In conclusion, the cost of "California vegetables at home" is perhaps worth a word from the housekeeper's standpoint. A young couple built a little cottage and began housekeeping. The investment of five cents at the door when the vegetable peddler came round daily, the housewife found, procured "three tomatoes, two cucumbers, and about four turnips," all large, fresh, and the best of the season. Other vegetables were about the same price, except cauliflowers, an extra fine head of which costs five cents. An average expenditure of five cents a day, the year round, was sufficient to get vegetables for a vegetable-loving family of two.

CHARLES H. SHINN.

TOMATO CULTURE UNDER GLASS.

TO SUCCESSFULLY grow the tomato under glass requires careful exercise of judgment on the part of the grower, rather than strict adherence to any set rules. The following notes, however, are offered as general hints to guide the cultivator:

Heat, light and pure air in abundance are the first requisites of success. Remembering the habitat of the tomato in its wild state, and noting the effect on the plants in the garden, of cold, dark days in spring and fall, we can readily understand the necessity of the first two elements. Pure air is necessary in order to avoid the influences of the constantly changing temperature outside, and that the condition of the atmosphere in the house may be under better control. The above conditions are all best obtained by having a large house. Twenty by fifty feet is a good size.

To make the best use of the house, two crops should be grown during the season. This will bring each crop at a season when the expense of heating, during a part of the time, will be light. Plants for the first crop should be started about the first of August. If the house is large, or if two or more houses are to be used, more seed should be sown in about three weeks to give a succession. For the second crop, seed may be sown in November. The plants will then be ready to take the place of the first lot when the fruit is off in January.

We have tried several kinds of receptacles for the plants when put in place for fruiting. Among these were ten-inch pots, and ten-inch wooden boxes, each containing one plant; eighteen-inch boxes containing four plants, and the open border. The eighteen-inch boxes have proved most satisfactory. These boxes are made a foot deep. In the bottom, cracks are left or holes bored for drainage. In preparing the boxes for the plants, place a good layer—at least an inch—of charcoal, broken crockery, or "clinkers" from the furnace in the bottom; then fill to within two inches of the top with rich garden soil, or better, with prepared soil consisting of three parts fibrous loam, and one part well-rotted stable manure. This method provides sufficient body of earth to prevent rapid drying out; and still the roots are somewhat confined, thus tending to induce earlier maturity of fruit than in the open border. The method is well represented by the accompanying cut, from a photograph of our tomato house last winter.

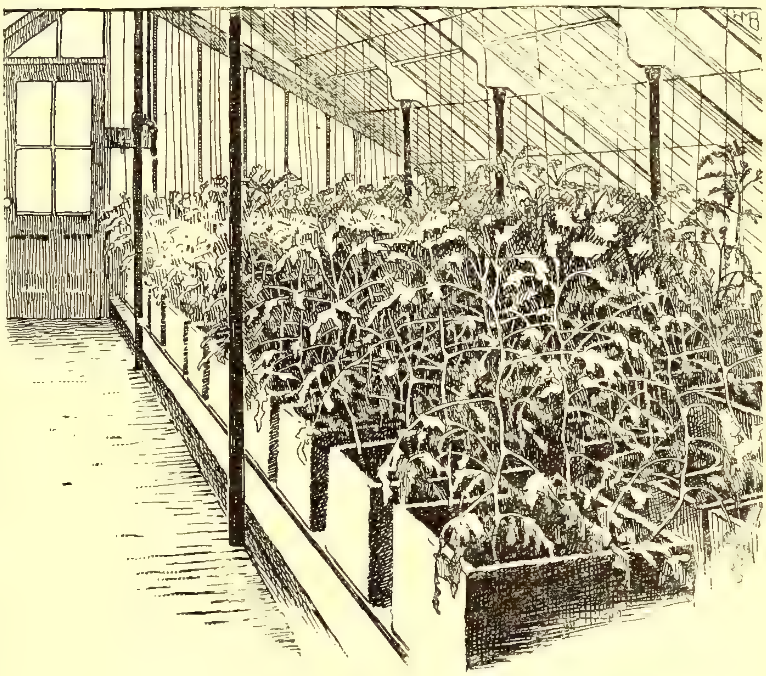
The fruit is always borne on one side of the stem, and it is a common notion that the plants must be so placed that this side of the stem shall be toward the sun. This precaution is entirely unnecessary.

In training, the plants are tied to small cords fastened to the corners of the boxes and attached above to wires running lengthwise of the building on the rafters. All side shoots should be removed as often as once in two weeks. As the fruit sets, the clusters should be supported by means of a cord or a piece of raffia passing around the main stem, below a leaf to prevent slipping, and forming a "sling."

When the plants are about five feet high, or when three or four clusters of fruit have set, the terminal bud should be pinched off. This will cause the vitality of the plant to be utilized in the development of the fruit. At this time it is well to stir the surface of the soil and work in a quantity of manure. A little more soil may also be added.

In the general care of the house, it will be necessary to attend carefully to: 1, temperature; 2, humidity of atmosphere; 3, watering; 4, pollination.

A temperature of 60° should be maintained at night. On bright days the mercury may run up to 80°, or higher; but in dark weather, ventilate at 70°. Do not permit cold draughts to strike the plants. While the plants are young, the atmosphere of the house should be kept quite moist, as the plants will make a better growth, and the "red spider" can be more easily held in check. When the plants are in fruit, the atmosphere must be dryer, but it is well, after pollinating, to sprinkle the walks and tables.


A Tomato House.—Training the Young Plants

In watering, special care must be exercised. An abundance of water should be given; still, the soil must not be kept saturated. A general rule would be to give eighteen-inch boxes a thorough watering every second day; or in dark weather every third day. The necessity of thoroughness in watering is emphasized, for trouble is frequently given by simply sprinkling the surface. The soil looks moist, but down where the roots are it may be perfectly dry, and as soon as the sun shines brightly, the plants wilt. This is a check which should never be permitted.

An advantage of watering only once in two or three days during the fruiting season, is the increased probability of successful pollination. The best time to pollinate ("fertilize"), is about noon on bright days. Previous to this time, the ventilators may be opened somewhat and the atmosphere dried by sun and artificial heat. The operation consists simply in giving each plant two or three sharp taps with a padded stick. It is quickly done, and is usually very satisfactory.

There are several varieties which do well under glass. All things considered, however, the Lorillard is, perhaps, the best forcing tomato. It is uniformly of medium size, good quality, handsome color, and is prolific. Volunteer and Dwarf Champion are good. The latter is too small, but is very handsome, and its habit is such that it may be grown much nearer the glass than other varieties. The larger varieties seem inclined to be irregular when grown under glass, and this is not admissible in a hot-house tomato.

Cornell University. W. M. Munson.

FORCING LETTUCE UNDER GLASS.

THE SOIL for growing lettuce should be composed of three parts of rich, sandy loam and two parts well-rotted horse manure. Thoroughly mix them together by turning several times, and make as fine as possible. This compost would be all the better if prepared and put under cover six months previous to being used. The plants should be ready for transplanting into the beds by the second week in September. They are thus put into market early, and the houses are used to the best advantage. To have plants ready at this time, prepare a bed of rich light soil out of doors, and plant it with true seed of the Boston Market, as that is one of the best kinds of forcing lettuce for early work, not later than the second week in August. Have a round rod two inches in diameter with which to make the drills, and press it into the soil about half an inch deep. The drills should be six inches apart. Sow the seed as thinly as you can and fill the drills with fine soil. Roll the bed, or walk across it until you have brought your whole weight upon every inch of the surface of the bed. Then give it a thorough watering, and never let the soil become dry. As soon as the plants are one inch high, thin them out to two or three inches apart. Keep the bed clear of weeds, and hoe often to keep the soil loose.

If your plants are not ready in time put the soil upon the benches to a depth of five or six inches, as lettuce sends its roots down deep. Rake the soil upon the beds fine and level; take the rod, as above directed, and make the drills half an inch deep and four inches apart. Sow each alternate drill with Boston Market lettuce, and the other drills with Olive Short-Top radish. The latter will be fit for market in four weeks. Treat the seed in the same manner as though sown out of doors. It is well to give the beds a good dusting with tobacco ashes, or with the dust from cigar manufactories, once every two weeks to prevent the appearance of the green-fly. Another good preventive is to tie strips of tobacco along sticks and lay these between the rows. Tobacco stems strewn underneath the benches will also aid in keeping out the pest. If green-fly once gets a good start in the lettuce, it is a very hard matter to get rid of it.

Keep the beds free from weeds by frequent hoeings, and never allow the soil to get dry, as lettuce, being of a succulent nature, requires plenty of water. Good drainage may be obtained by leaving the bottom boards three-quarters of an inch apart. The temperature of the houses should never rise above 50°, night or day. If the thermometer should register as high as 70°, ventilation should be resorted to. Open the houses on the side opposite to that from which the wind is blowing, if possible. After each crop of lettttuce, it is well to give the beds a light dressing of well-rotted horse manure, for the crop soon exhausts the soil.

Lettuce is subject to two serious diseases. One of these attacks the center, causing it to decay, and this continues until the whole plant becomes a rotten mass. This, I believe, is caused principally by a hard, wet, non-porous surface soil, and by deluging the heart of the lettuce with water, instead of spraying it between the plants. It is incurable. The other disease attacks the outer edge of the leaves. It first manifests itself by the leaves becoming hard and brittle. These then change to a rusty color, and this gradually spreads over the leaves, making them unfit for sale or eating. It is caused, I believe, by some fungus. There is no remedy for it. Some varieties of lettuce are more subject to the above diseases than others.

Fertilizers may always be used with advantage in growing and forcing lettuce, as the more quickly it is grown, the more tender it is. Peruvian guano may be used as a top dressing between the rows a few days after the plants have been thinned. Grind it to a fine powder and scatter it upon the surface of the bed at the rate of half-a-pound to the square yard. Hoe it into the soil. Nitrate of soda is another excellent fertilizer for lettuce. When dry and in a fine powder, apply it evenly at the rate of two pounds to five square yards. Be very careful that none of it comes in contact with the leaves, for they are easily killed by it. Stir the fertilizer into the soil. Ammonia is another good fertililer, as it produces leaf growth. It may be used about once a month. Put one ounce into five gallons of water, and water the beds.

Duluth, Minn. G. M. STRATTON.

OREGON HORTICULTURE.

QUIETLY nestling in an alcove of the Blue mountains lies a beautiful little valley—the Grande Ronde—sheltered from the cold and icy winds of the north, the dry and withering winds of the southwest, and the bitter, biting winds of the northeast. It has a climate admirably adapted to certain phases of horticulture. The temperature ranges from 60° to 85°—90° being exceptional—in summer, and from 60° to 80° during the remainder of the year. The soil is naturally deep, friable and fertile, and has the best of surface and sub-soil drainage. In winter the snow is ample to protect the roots and crowns of tender trees, shrubs and herbs, and sufficient rain falls during the summer so that irrigation need not be practiced. The Grande Ronde valley has within the past few years come to be considered one of Oregon's most favored regions.

The valley proper is about thirty-one miles long and sixteen miles wide. There are several "arms," however, which make its total area something like 500,000 acres. The greater part of this is easy of cultivation, being a prairie loam, varying in color, but uniformly deep, light, ashy and fertile. The sub-soil is generally gravelly along the borders—and here it is that in some seasons irrigation seems desirable—while toward the center and along the streams it is an alkali "pan."

The timber of the valley is found along the streams, and consists mainly of willow and alder. In the mountains there is an abundance of coniferous woods—spruce, fir, pine, cedar and hemlock. Not only is the valley promising from an horticultural standpoint, but also from that of the general farmer. In fact, it has for some time been noted for its quantities of fine cattle, horses, sheep and general farm products. In hay, especially, does it excel. Every year thousands of tons of baled timothy are shipped to the less favorable localities.

The orchards and gardens of this section are young, emphatically so, there being very few of any considerable area over six years old, and many, by far the greater portion, have been planted but two, three and four years. It was the productiveness of a few old orchards of ten or fifteen years, some old berry patches of a dozen or two bushes and vines, that pointed out to some sharp-eyed easterners the natural adaptability of the valley to fruit culture. Since then, only a few years ago, it is marvelous what an acreage of trees, bushes and vines has been planted, when we consider the markets, transportation facilities and population of that section.

The plantings of apples include chiefly the following: Ben Davis, Tompkins King, Swaar, Early Harvest, Red June, Pearmain (?), Pippins, Hawley, R. I. Greening; of pears, Bartlett, Clapp's Favorite; of plums, Italian (prune), Hungarian (prune), d'Agen (prune); of peaches, the only one, practically, is the French. This originated in the valley from a sprout set out by a Mr. French in '69. He had purchased some peach trees the year previous, and these having died, he allowed some vigorous looking sprouts to take their place, and from these, when they bore, he selected this variety, which gives universal satisfaction in this section. It is an early cling, ripening in July; the blush is very inviting and the flesh is of excellent flavor. Of cherries, Napoleon* (locally known as Royal Ann), Luelling* (locally known as Black Republican), Bigarreau* (locally known as Yellow Spanish) and Early Richmond; of raspberries, red and black—no names for varieties; of blackberries, Lawton, Snyder, Evergreen; of strawberries, Jucunda, Wilson. Currants and gooseberries are grown without any special care, as they are not in much demand in the market.

At present there is an excellent local market for all fruit grown. For example, during the past year the following fruits sold per pound at the given prices: apples, 2c.; pears, 5c.; plums, 2c.@3c.; peaches, 8c.@10c.; cherries, 10c., sold in gallon boxes; raspberries and blackberries at same prices. All fruit is sold green, save a little for home use. Large fruit is sold by weight, small fruit by the gallon.

Although strawberry culture has received especial attention during the past few years, it has had a much longer run than the larger fruits. James Hendershott, the State Horticultural Commissioner for the Fifth District, has two acres from which he gathers, on an average, 400 gallons per acre. These sell readily at 50 cents per gallon, marketed in returnable gallon boxes, costing 2½ cents. The dimensions of the boxes are 6x4x12 inches. Women and children do most of the picking and receive 5 and 6 cents per gallon. He cultivates in rows which are four feet apart and plants 20 inches in the row. The soil is not stirred from the time of blossoming till after fruit is all gathered. The most remarkable feature of the system of culture is that the plants are renewed only once every six years. He is convinced that by this method are the best results obtained.

When these younger orchards and gardens come into bearing, there will be ample facilities for transportation to outside markets. As a large section of the country adjacent to this valley abounds in mineral wealth, there will be near markets for all products for years to come. Then, besides, it is no great distance to that "great west where fruits, apparently, will not grow."

E. R. LAKE.

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*These three cherries are quite universally known throughout the state by their local names.

NEW YORK CHINESE GARDENING.

THE IMMENSE range of vegetable production in China is represented in this country to an increasing extent in different localities. The Chinese gardens of San Francisco and at the south already form a feature of marked interest in American horticulture. Preliminary tests of Chinese vegetables on Long Island also give results of practical value. This branch of gardening was first undertaken there about three years ago, and the Chinese gardens located in that quarter are able to supply the Mongolian population of New York with at least twenty varieties of their native vegetables.

The product, reaching Mott street semi-weekly during the summer, is sought by Chinamen from every section of the city, the table of the consul being largely provided from this source. There are three of these gardens under cultivation at Astoria, another *far yuen* tilled at Woodhaven, and the industry shows a gradual advancement each season.

The Chinese methods in horticulture are naturally somewhat modified in this vicinity. American implements of scientifically approved character are used, the soil being, nevertheless, frequently enriched as in the environs of Canton, instead of a western metropolis. Their system of cultivation is very precise, being conducted with the greatest care and diligence. The occupation, which in China is considered, next to letters, the most honorable of all, may also be followed on newer soil with consciousness of accorded rank.

As in Chinese native gardening, peas and beans form important articles of culture in these Long Island *far yuen*. The *doe goe*, or string bean, grows to a length of two feet, which is half the measurement attained by the species in China. Its vine is trained like those of American varieties on convenient forms of support. This Chinese bean ripens perfectly in its new location. Its seed is of a brown color, and of hardly larger size than a plumply rounded grain of rice. The sugar pea, known as *ho lan doe*, grows well and has fine, green, edible pods, exceedingly sweet in taste. Like the variety of its species familiar in this country, it is cooked with the shell.

An equally important series, considered in the nature of food, includes different species of the family Cruciferæ. In China the wild as well as the cultivated forms are eaten. The production specified as cabbage by the Astoria *far kung*, or gardeners, grows with loose leaves instead of compact heads. Another variety is the cabbage sprout, with the general characteristics of the European plant of that name. The *guou guai*, called in English mustard green, is apparently an indispensable element in Chinese living. Large quantities of it are imported in a pickled state. It is tied up in three-ounce parcels, packed in stone jars, and is constantly kept in the Chinese groceries. Its use is very extensive in all forms of soups and stews. Large quantities of it are grown in China.

Other forms of Chinese green vegetables on Long Island include one in the nature of the lily. This grows in the water, and has a hollow stalk like the bamboo; it is known as *own choy*. Another variety, called *bie choy*—the white green—shows a green top with a white stalk. A different green is *yen choy*—by which is meant lamb's quarter. The *tong choy*, growing about a foot high, is believed to correspond to no variety in this country. Another of the series is the *long na boe*, or snow-flake green.

The Chinese spinach—*boe choy*—is one of the varieties growing to a larger size in the Long Island gardens than the corresponding American species. Its crisp, clear-white stem is about the size of the average celery stalk, and is very tender and succulent when grown in heavily enriched soil. The high-flavored parsley under the name of *yuen si* has a fine growth. The lettuce, *shang choy*, and the celery, *hou kou*, are also cultivated.

The Chinese turnip, of a long form, is smaller here than in China, where it sometimes weighs fifteen pounds. It is a pure snow-white variety, tender and sweet. The shape of the *fon gua* or pumpkin, is that of an Indian club. The gourd called *foo low goe* is a variety easily identified, as it varies but little from our familiar forms. One kind of pepper, grown rather as a medicinal plant than for culinary use, bears a small, cone-shaped pod which is highly pungent. Two kinds of citrons are cultivated and have different uses. The *dong qua*, or north fruit, has a furry appearance, and is chiefly used in making soup. With the other, *zit qua*, the Chinese cooks make sweetmeats which are greatly relished.

The *foo qua* yields abundantly and forms an important article of consumption. It is one of the balsam pear varieties, belonging, like the East Indian balsam apple, to a species of momordica. The *far kung* sometimes fail to distinguish it by Anglicized name from the cucumber, *wong qua*, or in other cases from the egg-plant. It forms trailing vines which thickly cover the ground. Its small, yellow flowers gleam among the ornamental foliage until late in autumn. The fruit is not unlike the cucumber in its general form, but the outer covering is marked by raised divisions which resemble blisters. This product is bought at prices ranging from thirty to seventy-five cents per pound in the Mott street market. It is fried with chicken for Mongolian epicures, is chopped with pork, or with fish, and is an ingredient of many mysterious combinations. It is said to increase the appetite and aid digestion. It is used in medicine, and for this purpose is sliced, and dried in the sunlight at the gardens.

The *sing qua*, *Luffa acutangula*, is known in this horticultural group. Its rampant vine covers poles or trellises, and its luxuriant mass of foliage is dotted by a multitude of yellow flowers. The fruit is produced in great abundance, being gathered for marketing into deep baskets. It has a sweetish taste, and is used for soup. Its form closely resembles that of the long-necked gourd, but is marked by ten sharp exterior ridges in the direction of its length. Its inner portion is spongy, and when dry it can be used as a sponge. From this peculiarity the names of sponge cucumber, Egyptian bath sponge, dishcloth gourd, towel gourd and bonnet gourd have also been given it. When very young the fruit is eaten like cucumbers, uncooked, or it may be prepared by cooking like squash. The Chinese believe its effect as food to be similar to that of *foo qua*, and it is said to be most beneficial when too much greasy food has been eaten.

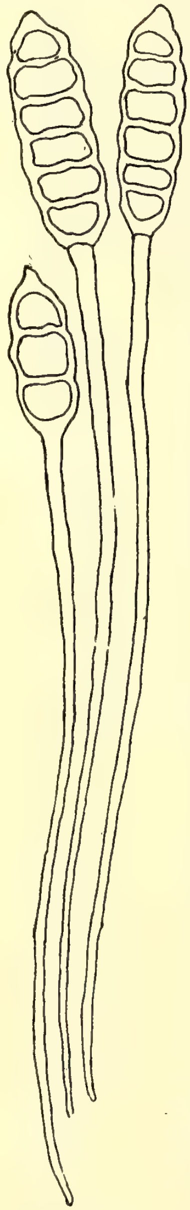


FIG. 1.
ROSE RUST.

The operations of another year will include the use of seeds successfully ripened within these gardens. Among these *far yuen* may be seen liberal quantities of little beans and seeds of the *foo qua*. These are dried in large circular baskets of very slight depth. The gardening equipment in use is of the simplest character. It includes many large jars, barrels for storing water, and different kinds of baskets.

ROSE RUSTS.

NO FUNGUS is more familiar to the horticulturist than that which constitutes the orange rust of the blackberry. For this reason I wish to refer to it in order to call attention to a certain rust of roses. The latter resembles the former in color, and both are of a deeper orange color and larger in mass than is common in fungi of this class. This rose fungus differs, however, in several points. It grows not only on the blades of the leaves, but on the stems, petioles and midribs. It forms not an expanded layer, but a strongly convex pustule, often of considerable size, and the stem or leaf is frequently bent away at that point. It occurs at the same time of year as the orange rust, or a little later. Microscopically, it resembles the orange rust in having the spores in chains, and in this respect both are like the cluster-cup of the barberry, which is the æcidial form of wheat rust. The cluster-cup spores, however, are included in a sort of cup or peridium, which is wanting in both the others. Still, it may be that each is the æcidial stage of some fungus. No other fungus form has ever been certainly found to be associated with the orange rust. With the rose rust, however, two other forms have been found associated, corresponding to the red and black rust of wheat. The three forms may be found on the same rose bush, at the same time, intimately associated. The uredo spores are delicate orange or yellow spores, consisting of a finely warty membrane, inclosing in spherical form its protoplasm and orange coloring matter. Each is borne on a short pedicel, from which it easily falls when ripe. These spores break through the epidermis of the under leaf surface in small pustules, the pustules being surrounded by a row of curved sterile bodies much larger than the spores. Later, but while both kinds of orange spores are still fresh, black spores begin to appear, commonly in the same clusters with the uredo spores. They are rather tall spores, and stand at the top of stalks somewhat longer than themselves, so that they are easily seen with the aid of a magnifying glass. In wheat rust the black spores have only two cells; in rusts of this genus (phragmidium) there are several, or many cells. This species commonly has about six cells, the number varying from three to nine. On account of its pointed apex, it is called *Phragmidium mucronatum* (Fig. 3). Other equally pointed or mucronate species were not known when this was named.

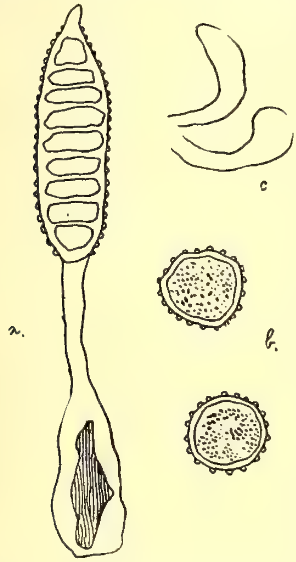


FIG. 2. SPORES OF ROSE RUST.

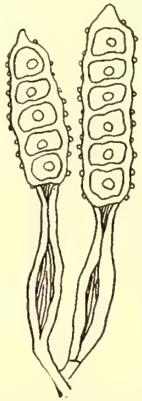


FIG. 3. SPORES OF ROSE RUST.

This fungus, in all its forms, is common on both wild and cultivated roses. The first stage has been observed as early as April, and the last as late as November. The form shown in Fig. 1 is not so common, but still is not rare. It is not known to have but one stage, and this occurs on the stems, or sometimes on the petioles, forming comparatively large black masses, *i. e.*, perhaps sometimes an inch long. As a microscopic object, this species is remarkable for the beauty of its spores, which is owing largely to the presence of the very long flexuous pedicels. It is called *Phragmidium speciosum.*

The third species which grows on roses in America may not be very rare, but if not rare, it has not been distinguished from the first. It is very similar to the first, but differs from it constantly in the larger number of cells in the black spores, which number sometimes as many as thirteen, but commonly about nine to eleven. Fig. 2 represents one of the black spores (*a*) with its swollen pedicel, two uredo spores (*b*) and two of the sterile bodies (*c*) which accompany the latter. This is apparently the form called by Mr. Peck, in the New York Museum Reports, *Phragmidium mucronatum*, var. *Americanum*, but I am convinced from comparison of authentic specimens that it is identical with the European *Phragmidium Rosæ-alpinæ*. All of these species are injurious to rose bushes, but the injury is not very conspicuous, and apparently not very serious in its extent. When any of them is troublesome, some relief should be expected from burning the fallen leaves, taking care, if possible, that none escape. Only the black spores are supposed to survive the winter, and these are destroyed by the burning. The effect of the fungus is to make many of the leaves fall prematurely.

The rose rusts are interesting to the botanist on account of their life history and the remarkable beauty of their spores.

Harvard University. A. B. SEYMOUR.

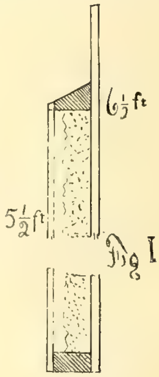
AUTOMATIC GREENHOUSES.

A REVOLUTION IN GLASS HOUSES—AN INVALUABLE INVENTION GIVEN AWAY TO OUR READERS.

IN THE April number of The American Gardner there appeared a description of a new greenhouse erected by Charles Barnard, at Stamford, Conn. Since that time further research has been carried on in the same line of work, and The American Garden has now secured the right to publish a detailed account of the experiments made by Mr. Barnard. No patents will be taken out on the inventions and improvements in heating and ventilating greenhouses, and any one is at liberty to make and use the buildings and apparatus here described. It is the aim to present the plan to the horticultural public in the hope that it will be of value to all who use glass in gardening. There is just now a rapidly-growing interest in the whole subject of culture under glass, and it is hoped that The American Garden, in laying Mr. Barnard's ideas before the public, will encourage many to use glass, both for business and pleasure.

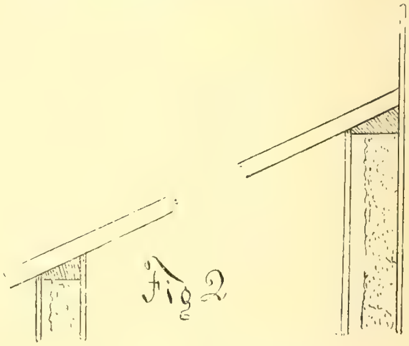
The first feature of the new house is its portability. The building was made in six parts, two back or rear wall portions, two front wall portions and two end pieces, one containing the door. As the soil was a heavy clay, and wet, a cellar 18 inches deep was prepared, and a single wall of stone laid for a foundation. The wall was also supplemented with rough boarding and banks of earth on the outside. In erecting such a house it is very important to secure a good foundation—air, frost and water-tight. The aim is to build an air-tight greenhouse, and for this purpose special attention should be given to the foundation, hard bricks laid in cement being probably the best. In dry soil the cellar may be three feet deep, as the deeper the structure in the ground the warmer it will be. A deep cellar also economizes in building the walls. Next to dryness and depth is shelter, and a building, hill-side, or even trees, to keep off the west and north winds will save money in the fuel bill.

The walls of the house were formed of a frame of 2x3 scantling, each section being simply framed at each end and top and bottom. On the outer face was nailed matched $\frac{7}{8}$-inch boards, planed on one side. Next to this was tacked on the inside a lining of cow-hair felt one inch thick. Inside, the frame was again covered with matched boards, leaving an air space of one inch between the felt and the inside boarding. The lower piece of the frame formed the sill, and the upper piece was cut diagonally to form the support for the sash. The diagram (Fig. 1) shows a cross-section of the frame, lining and boarding. It will be seen that the outside boarding is longer than the inside. This was for the purpose of forming a wind-break or guard against the north wind. The west-end section was also formed in the same way and for the same purpose.



Section of Rear Wall.

Each section had a joint or rabbet, and when the sections were put up in place, long screws were put through the rabbeted joints, thus holding the structure together. The sash were common hot-bed sash, and when the walls were in place they were laid on top, the end sashes covering the end walls. Strips of cloth were placed under each sash where-ever they rested on the walls, and the sash were screwed down on the cloth to make an air-tight joint. The joints between the sash were covered with battens. Figure 2 shows the structure of the front and rear walls with the boarding, felting, air space and sash.

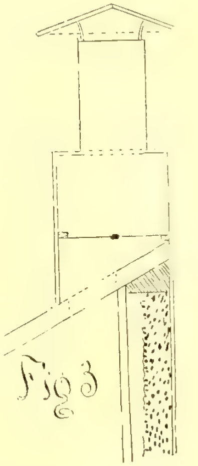


Section of Walls and Showing Position of Sash.

The door, placed in the east end of the house, was made like the walls, with felt lining, and was hung with a tight-fitting joint. The building was practically a refrigerator, and was designed to be, like the large refrigerators in meat stores, as nearly air-tight as possible, and, unlike a refrigerator, to keep cold out instead of keeping heat out.

The building measured 18 feet (6 sash) over all on top. The rear wall was 6½ feet high on the outside and 5½ feet inside. The front wall was 3 feet 3 inches high on the outside. The sash were 6 feet long, which gave, with the proper slope, a clear space inside of 5 feet 8 inches. The interior length was about 17 feet. The cellar being 18 inches deep gave ample head room at the rear. The table extended across the west end and was 15 feet long, giving a table surface of 51 square feet, and shelving at the back and ends gave a total of 74 square feet of available space for plants. Rhubarb was also cultivated under the table.

It will be observed that no means are provided for raising the sash to secure ventilation. To permit the warm air to escape and to exclude cold drafts, four lights of glass were taken out at the upper end of one sash near the middle of the house. This gave four openings, 8x10 inches, 320 square inches. On these openings was placed a wooden box or trunk, 12 inches high at the back and with a flat roof or hood. In the center of this trunk was cut a round opening 12 inches in diameter, and over this was placed a sheet-metal chimney, having a cap or hood at the top, the chimney being 18 inches high. Within the trunk was a valve carefully balanced in the middle and fitting tight when closed. Figure 3 gives a section showing the ventilating trunk, chimney and valve in position on top of the sash. The trunk was three feet long and 15 inches wide.

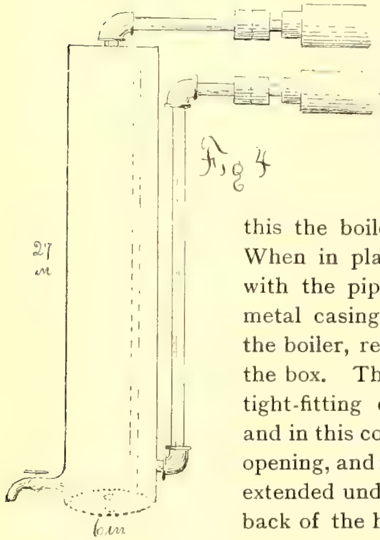


SECTION OF VENTILATOR, CHIMNEY, CAP AND VALVE.

It will be seen that this system of ventilating keeps out all back drafts or cold winds that, by the usual method of ventilating, are sure to blow down on the plants. Experience with this ventilator in actual operation over several months, including cold, windy days in March with hot sunshine, shows that it was ample to keep the house at any required temperature. The actual outlet for the hot air was only 12 inches in diameter, but it was sufficient, because the valve began to open the instant the heat began to accumulate. Being automatic, there was no delay waiting for some one to open the house, and the instant the temperature rose above a certain point (say 80°) the valve began to open, and as soon as it was open, even a quarter of an inch, the hot air began to go out. In like manner the moment the temperature began to fall the valve began to close. Even a cloud passing over the sun caused the valve to move, and if the cloud remained more than a few moments, the valve would completely close, thus cutting off the waste heat. The manner of operating the valve was very simple. A large thermostat was hung on the under side of the sash and connected by balanced rods and bell-joints with the valve. The actual movement of the rod of the thermostat was only one fourth of an inch, while the complete movement of the valve was over three inches. By the use of suitable bell-joints and rods, it was not difficult to adjust the valve to the thermostat so that they would move together automatically under the heat of the sun shining through the glass.

Next in importance is the peculiar heating system invented by Mr. Barnard. It is not a new idea to put an oil stove in a small plant house. The novel feature was the placing of a hot-water boiler on top of a common two-wick oil stove, and using the boiler to heat hot-water pipes. Even this idea would not be of value were not another idea supplemented to it. This is to utilize the heat of radiation from the stove, and at the same time to get rid of products of combustion. To do this the boiler was enclosed in a sheet-metal casing, and from the top of the casing a small chimney extended through the roof. By this arrangement nearly all the heat was extracted from the stove without allowing any of the smoke or gas to enter the building. The boiler was made of sheet zinc, and was 27 inches long and six inches in diameter. In the boiler were set four tubes made of one-inch gas pipe, thus making a tubular boiler. At one side, close to the bottom, was fitted a one-inch pipe, and another was fitted to the top near the center. Figure 4 shows the boiler and connections. On each pipe were placed union couplings, and to connect the pipes with the two-inch hot-water circulating pipes reducing joints were used, as shown in Figure 4. In the figure, dotted lines show one of the flues in the boiler and the positions of the others are indicated at the bottom. A water-cock on the boiler is also shown. The upper pipe is the "flow," and the lower pipe passing down the side of the boiler to the bottom is the "return." The circulating pipes extend along the front of the house and across the end to an expansion box, open on top. This gave 38 feet of two-inch pipe, but experience showed that the boiler was able to heat 80 feet without difficulty. The pipe used was sufficient for the mild weather of last winter, but more pipe would be far better.

The boiler was placed on top of a sheet-metal box 14 inches square, and having a door in front. An opening in the top of the box, a little larger, was covered with an iron grate, and on this the boiler was supported. When in place and connected with the pipes, a round sheet-metal casing was placed over the boiler, resting on the top of the box. This casing had a tight-fitting cover at the top, and in this cover was a two-inch opening, and from this a tin pipe extended under the sash to the back of the house and then out through the post, a cap on top serving to keep out the rain. Figure 5 shows the position of the boiler within the casing.

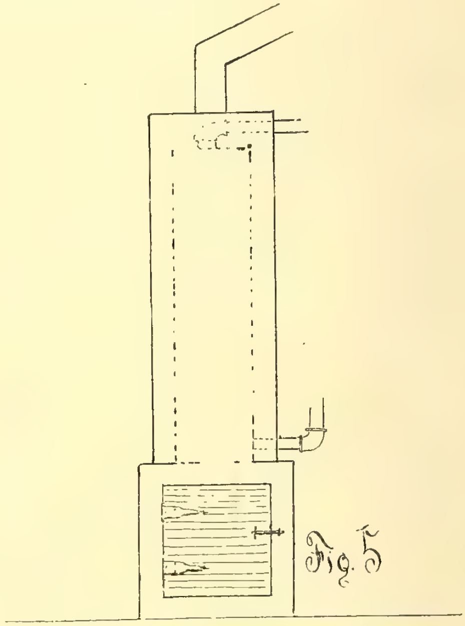


Section of Boiler.

It will be observed that all the heat of the gas or oil flames must pass up through the flues of the boiler or along the outside. At the same time all the products of combustion are completely removed and escaped into the open air through the chimney. The boiler and casing were placed directly in the greenhouse under the sash at the south-east corner. The point aimed at was to keep within the building all the heat of the flame. Not only did the water extract a large part of the heat and carry it to all parts of the house, but the box containing the stove, the casing and chimney gave out heat of radiation directly into the house. This explains why a single gas-burner (equal to a common small lamp) kept the house warm. All or nearly all the heat was saved. With both wicks burning in the oil stove the top of the chimney was barely warm, and the hand could be put over the top of the chimney without inconvenience.

The point is just here—complete utilization of nearly all the heat (perhaps 95 per cent.) directly in the building, a perfectly air-tight building, and a continuous and unvarying source of heat. It took from two to three hours to heat the water pipes, but once heated, the oil stove kept the building warm through the coldest nights. No coal or wood fire is ever alike for more than a few moments. A gas flame or oil flame does not vary in intensity after the first ten minutes. Once filled with oil, the stove burned without attention day and night till the oil was exhausted. With a large tank such a stove would heat a greenhouse without attention for several days. With gas there was, of course, no attention needed after the flame was lighted.

To make the heating apparatus automatic, a valve was placed on the gas-pipe, and this valve was controlled through rods and bell-cranks by a thermostat hung on the wall of the greenhouse. The morning sun shining on the glass warmed the building, and under the influence of the heat the thermostat expanded and shut off the gas, but not completely, because that would involve re-lighting the gas in case clouds obscured the sun. The flame was merely turned down low. If clouds appeared, and also when the sun began to go down, the temperature fell, and the thermostat contracted, turning on the gas again. The two thermostats worked together, one a little in advance of the other, and sometimes only one operating, as they were set for different temperatures.



Section of Casing, Boiler and Chimney.

From the experience gained, it is clear that greenhouses can be made by these simple means perfectly automatic. Gas is the best fuel, because it is most easily controlled and practically unlimited in supply. An oil stove requires a large tank to run 48 hours without re-filling, and to control the flame a special form of extinguisher must be used.

Setting aside the automatic side of these improvements, the house itself is worthy of imitation, as it is portable, and because it can be operated at great economy of fuel. The peculiar form of ventilation is also a good idea, even if the valve has to be operated by hand, because it prevents back drafts of cold air and saves the heat of the sun and fire.

Mr. Barnard was assisted in his experiments by George A. Weber, of Stamford, and their inventions and improvements are offered by The American Garden to the free use of all who are interested in the use of glass in horticulture. The idea of heating greenhouses by gas or oil can also be applied to hot-beds, and it is the intention of The American Garden to soon lay plans for a new system of hot-beds before its readers.

TARRYTOWN LETTERS—XII.

A TRADE SUSPICION CONFUTED—MRS. TARRYER'S WEEDING THIMBLE, AND HOW IT WORKS.

BY A. B. TARRYER.

FROM the way trade and magazine writing goes nowadays, many excellent people have supposed, in spite of Mrs. Tarryer's desires to the contrary, that the illustrated letters in the May and June numbers of the Garden, giving an account of certain weeding-tools, were but a thin cover for an implement business, and that the desirable tools pictured could be bought, if only word could be got through to Mrs. Tarryer that such were wanted in sundry places. Ready trade pops at the touch of a single postage-stamp, but chaotic realities of the future only crystallize after years of patient thought and work. Mrs. Tarryer is as helpless in the matter of garden-tools as anybody else is, except that she has long known how some of them should be made, and has labored for many years to provide herself and, incidentally a few friends, with weapons of precision for governing the garden. But there is no more trade or manufacture of her styles of garden-tools at present than of pipes for the American mound-builders. Her implements were portrayed in the Garden so that our nakedness of fit tools for hand-weeding—while the land is being overrun with "worthless botany," as Parson Camperdown calls weeds—might become better understood, and in the hope of creating the demand manufacture requires to set its wheels in motion.

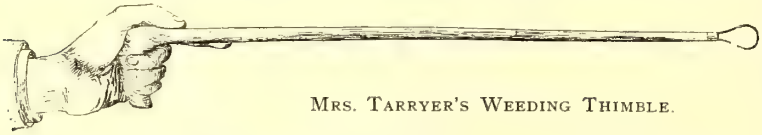
Mrs. Tarryer's many friends, visitors and correspondents are hurt in their feelings, sometimes, because she can't give or sell some favorite garden-tool to those who really want and need it to be quite happy. She sympathizes deeply with such cases, for they can't see, in the midst of our whirling machinery, why it is not easy as rolling off a log to get her hand-tillage implements duplicated without number. When our girls and boys go forth gaily into the garden with elegant and efficient means in their hands for conquering the weeds there, it is extremely difficult, for one who has not observed widely and thought deeply of this matter of weeding and tool-making, to realize that there is not a mill close by turning out cords of Mrs. Tarryer's weeders.

It is, indeed, a wonder how within forty or fifty years the country smith who could make beautiful axes, hay-forks, hand-irons, or embody to order any other domestic idea in metal, has become utterly extinct and gone, and how his place is poorly filled with the produce of factories and men who fashion things by models, often degraded, that do not fit our growing cultures, and of whose original intention the hurried artificers know or care nothing.

No doubt Mrs. Tarryer has intended all these recent years, that sometime her tools should be well made, and in sufficient numbers for the discerning cultivators who select and buy for their own uses. She has tried her weeders in the hands of all sorts of people to bring out their worst as well as best points with a view to perfection. Often have I seen her face wince at the casual remark of one who was using her hoes for the first time, when she got a new idea, and I knew it would cost $25, $50, or $100 to realize it exactly in a single sample.

I have been to the bosses of factories with her, and she has invited some of the best of them to Tarrytown. "Do you expect to have that thing made for Irish, Swedes, Norwegians, Poles, or Italians?" (specifying the foreign brethren most inclined, in his opinion, to break things), would often be the first question, when the extreme lightness and keenness of some of her implements was first felt in the surprised hand of a manufacturer. After a good dinner and a survey of Mrs. Tarryer's gardening—absolutely weedless for such an occasion, with the mellow loam looking as if it naturally fell in tilth around each plant in her exquisite cultivation—these gentlemen would take a business-like interest in her tools for a few moments. Once an eminent company, persuaded by her proofs of utility, did attempt to make two or three hundred hoes, but never really equipped themselves with fit machines, dies, etc., in determination to have them done cheaply as well as in the best possible manner.

"There is no demand for as good garden-tools as these, Mrs. Tarryer"—or, "you'd better use malleable iron for this part"—or, "why isn't a common shank and ferule as good as that wrought and polished socket?" were the common remarks of these manufacturing characters. They evidently had little faith in the permanent garden purposes of the people of this broad land, and they were partly right. Lord Bacon said in his old time that the English built better than they planted. So do the Yankees. We say "We can buy garden-stuff cheaper than we can raise it." Yes, and we might as well say we can import grown people cheaper than we can raise children, but a feeling is gaining ground that these reasonings, in a private as well as public point of view, fall to the ground of their own rot. There is no eternal life in them. It was Judas who sold cheaply. Only dear things are worth having.



Mrs. Tarryer's Weeding Thimble.

Last summer was a very weedy one. But Mrs. Tarryer still believes in the essential humanity of her garden-tools. She has invented a new one of fine tempered steel. Parson Camperdown says it beats all for carrying out the old doctrine of infant damnation for weeds in its purity. I enclose a picture of it. "With that in hand, weeds can be elected to die young—they are happiest so"—is another of his remarks. He says the old preachers were not fools, but weeders, who believed, first and last, that government must begin in the garden; that the men farmer Cromwell recommended to John Hampden as fit to cope with the roistering gentry who followed King Charles, were men who were used literally to governing the land—that the "Ironsides" was a regiment of weeders.

We call the new implement "Mrs. Tarryer's Weeding Thimble," because she used the first one she had in a stooping posture, with her forefinger in it, as her father used a very thin old case-knife, bent at the end. It can be made of any weight, for all sorts of people; stiff enough to haul out the rankest weeds, grass and thinnings from thick-set blackberry rows, or of delicate spring-steel, fit for the tiniest weeds in seedling grass-plats, and with little knob-handles from six inches to six feet long.

"Why don't you get that patented?" many ask Mrs. Tarryer. Well, she showed it to one patent agent—the very tool in the photograph. He caught on to the novelty at once, and said "That steel spring must be of great value in relieving the nervous shock from the jar of concussion with a billiard ball." *He could get a patent on it for a billiard cue!* Another agent asked, "Is it intended for pruning trees?" It is not likely that the employes of the patent office are judges of weeding implements, else the grass around the Capitol would not be overrun with garlic. To get a patent an invention must cause the observer to fall over backwards with astonishment—no matter whether it is good for anything or not. The patent office was designed to assist, protect and reward useful inventions, and though many of our commonest implements sadly need remodelling in the interest of all handicrafts, neither patent law—or the rulings of courts which have muddled the law—tend to any such ends, but rather to leaving the public a prey to the confidence-games of agents and the blindness or worse of ignorant officials. Meanwhile, as I said before, the curse of weediness and sterility is upon us.

Of "Mrs. Tarryer's Weeding Thimble," she has had a dozen made with infinite patience, trouble and cost, by more than as many different mechanics—hoping to get one that is just right for a model. They are all effective implements, but not one is fit to send the editor of the Garden, and all would be needed as guides or warnings for an acute manufacturer.

Among intelligent mechanics a feeling is growing that a patent is of no use—even as an advertisement—so much nonsense has been patented. Some say the old maxim of "Live and Let Live," is coming in force, and that when a manufacturer shows that he really knows how to make anything right, his fellows courteously let him do it. If this is not too good to be true, the patent office may fall into a state of innocuous desuetude, unless it goes back to its first principle of understanding our industries and helping and protecting them towards perfection.

In that case Mrs. Tarryer would stand over a few more blacksmiths and handle-makers, in the hopes of getting a "Weeding Thimble" made nice and strong for Commissioner Mitchell and all his clerks to try in their gardens.

You should see her deploy her forces equipped with these millennial instruments! She has a piece of land fallow that she designs for a garden next year. She declares there is no literature describing the best process of fallowing land. Writers are weak in details. The husbandman who does it well has no time to write about it. If you plow and harrow deeply and often, weed seeds don't sprout from the loose soil and be killed. Garden earth must be compact as well as moist during hot weather to promote germination. We might plow and harrow often enough never to sprout and kill a weed.

So when showers have laid the dust upon the smooth surface of that prospective garden-ground, lying as fair as a tennis-court, Mrs. Tarryer ranges her boys and girls facing it, with seven or eight feet of space between them, and explains for the benefit of new hands that the "Tarryer" (for short) must be constantly swinging before them to be ready to hit every weed at sight. So the orders are "Right!—Swing!—March!"—and away they go! It is a pretty sight—just the thing for a weedy school where both sexes are trained together in the garden. The weeds on several acres lie blasted in the track of the young people, after an hour's sun, as if the fire had swept over them. This is done quicker and much better than horses could do it. Mrs. Tarryer often calls a "Halt!"—to explain the nature of the different weeds—how you needn't strike portulacca as low as you do rumex, and the like.*

Fall winds are blowing now, to be sure, but we must have the idea of weeding constantly in mind, or no manufacturer will bring out "Mrs. Tarryer's Weeding Thimble" right in time for next season. A light hay-fork is a terror for small weeds, however, in hands that mean to kill them.

Mrs. Tarryer says the above is all right, but I wish to add a word about M'Tavish, Mrs. Schnipticket's factotum. He is growing too stout to stoop much, and he did Mrs. Tarryer the questionable honor of carrying one of her "Thimbles" all through carrot and turnip time, greatly to her satisfaction. He says it is the very thing for singling and weeding root crops. He can't see a turnip within a yard of him, and Mrs. Tarryer's long handle reaches to the line of his horizon, so to speak, but any man who is a trifle undersized will sympathize with my disgust at the insinuating way these big, broad Scotchmen have with women.

A. B. Tarryer.

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*Pusley and sorrel.—Ed.

The Editor's Outlook.

FUNGI AND THE PEOPLE.

"EVERY plant that the farmer, gardener and fruit grower cultivates is subject to the attacks of one or more of these parasitic foes. The grape alone has more than fifty of these pests, and it is a wonder that we are able to grow this choice fruit at all! More than two hundred and fifty species live upon the apple, and it is very probable that fully one-third of these are positively injurious." It seems strange that we have never known until within the present generation how many are the enemies of the agriculturist. We have attributed our failures to Providence and the weather, or if we could find no better reason we have laid them to the moon. Now we are finding out that obscure failure is due to some definite and individual agency, and that agency is oftenest a fungus or an insect; and we are looking so sharply for these insidious foes that we are discovering the causes of failures in which they have no share. We sometimes think that the greatest good which this increasing knowledge of fungi can bring is the sharpening of our wits. It is certainly a great educator, even to the man who knows nothing about fungi; he is led to look rather than to guess.

"Despite the fact that these microscopic foes have destroyed our crops for years, causing annual losses of millions of dollars, no intelligent attempt worthy of note was made to investigate them until within the past ten years. Five years ago practically nothing had been done in this country toward checking their ravages; in fact, it is only during the past three years that anything like a systematic effort in this direction has been put forth." It is stimulating to live in this new era of inquiry. We are picturing to ourselves the time when the greatest perplexities of the farmer will be overcome, and most of us even hope to live until that time. Certainly every year marks great progress. No doubt this uncompleted year has itself seen greater progress than has been made in some entire centuries. But we must not expect too much. To-day a scientist discovers a new enemy, and to-morrow the world is demanding a remedy for it; and if perchance the remedy is not forthcoming, demand warms into complaint and impatience. We know that there is more than one experimenter who hesitates to announce a discovery unless he can announce its "practical" bearings or utilities at the same time. The public seems to say that it is better not to find an enemy than to find him and not dispatch him forthwith. All this is a direct and positive hindrance to investigation. The truth must be discovered before it can be applied.

We should not be impatient if we cannot find remedies for all our ills. Progress is rapid, perhaps rapid enough. It is better to feel our way in a measure, for thereby we avoid costly mistakes. We are making the acquaintance of our friends and foes, and the more we learn of them the more completely can we control them. The farmer and horticulturist must get themselves into line with this new work. Most of them are not yet able to comprehend it fully. We expect that results will come as fast as people are ready to apply them. The investigators are now far ahead of the practicers. The majority of fruit growers are still asking how to kill the codlin moth!

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ABANDONED FARMS.

THERE IS much talk of the enfeebled condition of agriculture, and the abandoned farms of parts of New England are cited as proof of it. There is no doubt much farm land in Massachusetts, New Hampshire and Vermont which is no longer tilled. It has been given over to pasture ranges and second growth forest. But so far from forecasting a general decline or enfeeblement of agriculture, we are confident that this abandonment is the strongest proof of advancement. It indicates that farmers are outgrowing the traditions of their fathers, and are beginning to adapt their business to their conditions. The greater part of the abandoned farms are not fit for tillage, and we rejoice that their occupants have discovered the fact.

We had almost said that these lands ought never to have been tilled, for this is a common statement; but the rugged New England farms have bred a hardy and determined race of farmers which could hardly have arisen on the softer soils of the west. Having bred the men, they have accomplished a mission, and they are now entering upon their true and proper sphere—that of timber lands and grazing ranges. The more tillable and richer lands of the central and western states must forever supply the greater part of the gross crops, and the abandonment of eastern hills is but a realization of this fact. Farming must be adapted to regions.

There is no question but that the area of grain growing will soon begin to work eastward. The slovenly and speculative farming of the prairies is exhausting the soil and breeding a deplorable and weedy recklessness. The grain-producing capacity of the western lands is constantly decreasing; that of New York lands is increasing. Slack methods are responsible for the one; clean and scientific methods account for the other. Wheat growing in the Genesee valley is even now more profitable than in Dakota.

But we do not expect that grain growing will again become the staple of New England agriculture, for the conditions are not adapted to it. The fertile valleys are as profitable as ever, and they can be made still more profitable by the use of special crops. Horticulture must supplant agriculture in many regions. Many of the hill-sides afford admirable ranges, and the wilder and more barren regions must be given over to forests.

This is what the abandonment of the New England farms means. Agriculture is undergoing revolution. We are learning to work with nature rather than against it. Massachusetts is still a desirable state for the intelligent and energetic farmer; others must go elsewhere.

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HORTICULTURE AT THE WORLD'S FAIR.

THE HORTICULTURAL association which has grown out of the delegate convention called to consider plans for horticultural exhibits at the Columbian Exposition, has entered upon its work with energy and comprehensiveness. It has formed itself into a body which is to exist during the exposition, and has adopted a memorial to the National Exposition Commission urging the importance of a separate and distinct horticultural exhibition, and it promises to "undertake, under proper conditions, to place in this exposition a comprehensive exhibit of the fruits, trees, plants, flowers, seeds and garden products from the known world, both in the growing state and the natural products as harvested." In order to forestall any chance of political appointees filling the important positions, the association has recommended to the commission five persons as superintendents. The recommendations are well chosen, and we see no reason why all horticultural interests should not second them heartily. The choice of Parker Earle for general commissioner of the horticultural interests must be gratifying to all. As commissioner of the horticultural exhibits at the New Orleans Exposition—the only truly national horticultural exhibition which we have yet had—and as president of the American Horticultural Society, he is well known and must be peculiarly well fitted for his new duties.

The government exhibits at the World's Fair have been placed in charge of Edwin Willits, Assistant Secretary of Agriculture, a man who is eminently qualified in all respects to conduct a representative exhibition. We are assured that he desires to make the horticultural features prominent. With two representative and broad men to lead, the horticultural features of the great Exposition ought to eclipse anything ever attempted.

In men and organization there is nothing more to be desired, and we do not doubt that all the details will be worked out with wisdom. The fact should not be overlooked that this Exposition will furnish unprecedented opportunities to study plants and their products in a most comprehensive way, both in purely scientific and practical directions. Some means should be provided by which specialists can study certain groups and publish monographs of them. Occasions are few when such facilities are offered, and they should not be lost.

We are also looking for a permanent organization to grow out of this Columbian Horticultural Association. For some time there has been a movement on foot to consolidate all national horticultural organizations into one congress of horticulture, somewhat after the general plan of the American Association for the Advancement of Science. Such a federation would enable one to attend all the national organizations at a minimum of time and expense, and it would coördinate and intensify all horticultural interests. Each organization would still retain its individuality as now, but all could meet consecutively in the same place and each could receive the benefits accruing from contact with other interests. No doubt all our national horticultural organizations will unite in an endeavor to make a worthy horticultural display at Chicago, and after working under the Columbian Horticultural Association it will be but a natural effort to clasp hands in a general brotherhood.

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IDEALS FOR FLORISTS.

THE Society of American Florists has a high ideal set before it in the address of the retiring president. The Society should be more than a trade organization. Its objects are "not only to instruct its members in their daily avocations, but to educate the masses in horticulture by widening and deepening an interest in our profession, by increasing our membership, active and honorary, until we embrace all the leading men of the country who are interested in the various callings of horticulture, all men engaged in scientific research tending to advance the profession, the formation of kindred associations, encouraging exhibitions of plants and flowers, by bringing into closer relations the retail dealer with the grower and wholesale dealer."

All this calls for general education and culture, and it demands a more wide-spread appreciation of ornamental gardening. We have not yet come to that stage in this country when gardening is in general appreciated as a work of art. Ornamental gardening is usually judged solely by its gross form and color. Gardeners must get out of old ruts. They must put spirit and expression into their work. But this means that the gardener must be educated.

President Jordan sees two general ways of elevating the garden and the gardener. Cities are growing, and the country is taking on a better life. Gardening is adapted to all conditions, "and it is committed to our hands to extend our parks and boulevards far into the country until city is linked to city, and the most rural districts will feel the vitalizing forces of plants and flowers." Those who are benefitted by institutions of learning "are very few compared with the great mass of people that frequent our parks and public grounds to take object-lessons, where young and old, rich and poor, learned and illiterate meet on one common level to drink in nature's best gifts to man." Yet in the educational institutions a higher and more symmetrical culture can be attained. President Jordan again calls the attention of the Society to the importance of some school training for the florist. "Science shows us how the things we have to deal with in our homeliest toil connect us (if we but understand the linking) to what is most elevating in man's thoughts and hopes. It helps supply that food for the mind, without which we starve in drudgery, but by the strength of which we rise to a higher plane of life."

The education problem has long been a vexed question among the florists, and there is yet no appearance of a solution of it. Members are divided by conflicting aims, and there has been no one with a practicable and clear-cut proposition who could lead the organization to any definite action. Many are making the vital mistake of supposing that the first requisite in a florists' school is a corps of florists to direct it. The first requisite in any school is men who can teach. When it so happens thas the teacher is also a successful grower, the highest ideal is attained. But the first requirement of any man who imparts instruction is ability to fire the enthusiasm of his students. So it often happens that the most successful teachers are distanced by their pupils. President Jordan thinks that wealthy men could be induced to endow florists' schools, and no doubt they will do so as soon as they feel assured that a sufficient demand and interest exists. But some of the land-grant colleges would no doubt take up this work actively if the florists should once present a definite plan or request to them. Nothing can be accomplished without united and positive action, and the apparent lack of interest in the discussion which followed President Jordan's address to the Society at Boston seems to indicate that the time is not yet ripe for florists' schools.

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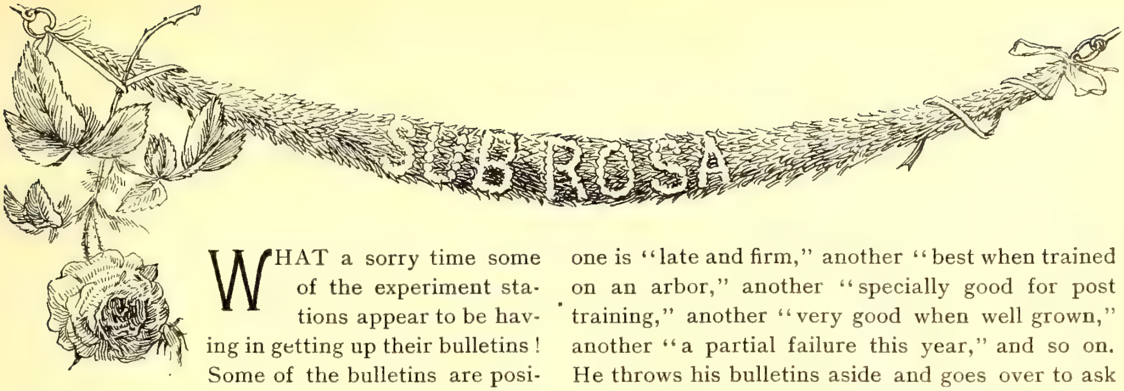
BOTANICAL LANGUAGE.

THERE comes up periodically the attack upon botanical terminology. This criticism possesses the merit of age and of popularizing the very terms which it seeks to destroy; otherwise, it has little substance. It is true that the technical terms are always obscure to those unacquainted with the science to which they belong, but such persons are not called upon to use them. They are never troublesome to the scientist, to whom they belong, and who alone must pass upon the merits of them. Science must have a technical language or it at once ceases to be science or exact knowledge.

But it is urged that these botanical terms are derived from the Latin and Greek and other tongues. So in the English language. Their classical form is one of their chief virtues, for it allows of their incorporation in other languages with but trifling modifications. Those who have occasion to read German technical works may well wish that that language had also drawn upon the Latin and Greek for its terminologies! No English words exist which could express the ideas briefly and clearly; and when new words are to be made, it matters little about source, for it is only through use that they become English. To substitute a new terminology for the old, as some have urged, would be to begin all over again and to naturalize a new vernacular as cumbersome as the old.

It is urged again that names should be illustrative, that they should "mean something." But it should be remembered that terms have meanings only when associated with some particular thought: they possess no intrinsic worth beyond their mere histories. It would be impossible to explain or even indicate the niceties of scientific thought by single words, and when phrases are used we at once invite confusion. What possible terms can be easier and better than *diœcious*, *polygamous*, *proterandrous?* It is an easy matter to make ridiculous and amusing examples of scientific terminology; but it is quite another thing to devise a better system.

SUB ROSA



WHAT a sorry time some of the experiment stations appear to be having in getting up their bulletins! Some of the bulletins are positively repulsive because of the entire lack of all attractive mechanical features. Talk as much as we will about the importance of truth unadorned, it is still true that the public wants even this precious commodity dressed out in a stylish suit. It has lately been said that the bulletins lack good editorial features, and it is the most pertinent criticism which has yet been made upon station work. Poor paper, poor press-work, poor type, jack-knife illustrations, absence of method, and grammatical and rhetorical gymnastics, cannot make a good bulletin, no matter how valuable the facts may be. Numbers of the bulletins have little method, and are not attractively written. A bulletin before us announces upon its first page that the subject is to be discussed in four divisions, but one of the divisions cannot be found in the text, while an extra one is added. And it is almost the exception to find a bulletin in which the arrangement of head lines and divisions is logical and perspicuous.

But what shall we say of the composition! We had intended to make a collection of the unconscious inaccuracies, obscurities and absurdities of expression, but the task is too great even for the scissors and paste-pot. "I advise those whose trees are suffering," writes one, "to dig holes by the side of them, fertilize them and, after several weeks, transplant in these holes, cutting them back severely." We should be pleased to receive a sample hole, cut back as directed!

Then there are the interminable tables, which bristle with figures and which are seldom read. A concise, condensed and perspicuous table is always useful but it is not often found. Writers seem to forget, or never to have known, that tables should present conclusions, that they are not the proper vehicles in which to record popular observations. Or if it should happen that certain extended matter is best stated in tables, then a short and direct summary or conclusion should follow. A farmer wants to plant a vineyard, and he sends for grape bulletins. He finds the merits of varieties expressed in tabular form with no summaries. He finds that one is "late and firm," another "best when trained on an arbor," another "specially good for post training," another "very good when well grown," another "a partial failure this year," and so on. He throws his bulletins aside and goes over to ask neighbor Jones, who never saw a bulletin and never heard of an experiment station, what kind of grapes to plant!

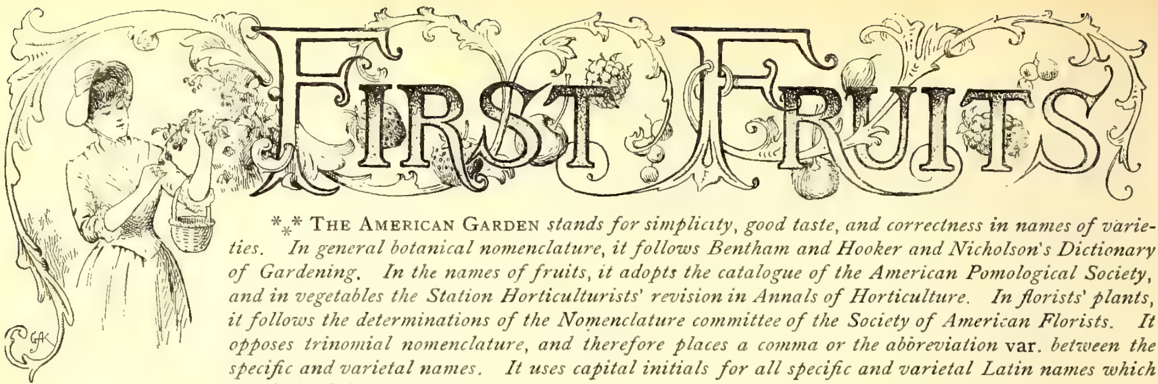
⁂

WHY not have horticultural institutes? There is no reason why institute work should not be profited by division of labor, especially as most fruit or truck-growing regions possess comparatively few interests of a general agricultural character. A horticultured institute in an horticultural country, a dairy institute in a dairy community, a grain-growers' institute in a grain-growing territory should accomplish more than mixed institutes. With the greater activity and specialization in agricultural pursuits comes a greater demand for exact teaching. So we are looking for more special institutes, more "special courses" in this universal farmers' college. The instructors must be the best specialists that can be obtained. Money and energy judiciously spent in institute work always pay a large dividend.

The first state horticultural institute yet held, so far as we know, convened at Oswego, New York, last spring. It was in every way a success, notwithstanding the fact that the horticultural interests of the section are comparatively new. Two general institutes held shortly before in the same city had indicated what the growers could expect in the way of instruction. The success of this first endeavor was so marked that other horticultural institutes will be held in the Empire State during the coming winter. Let other states follow.

⁂

ONE of the most urgent needs of the fruit grower and vegetable gardener at present is organization. There are several vital interests which demand union of action. Study of markets and transportation for the purpose of making a judicious distribution of products and to lessen cost of carriage, must demand first attention. It is only through united action that insects and fungous pests can be overcome, and that legislation can be influenced in a proper way.



FIRST FRUITS

⁂ THE AMERICAN GARDEN *stands for simplicity, good taste, and correctness in names of varieties. In general botanical nomenclature, it follows Bentham and Hooker and Nicholson's Dictionary of Gardening. In the names of fruits, it adopts the catalogue of the American Pomological Society, and in vegetables the Station Horticulturists' revision in Annals of Horticulture. In florists' plants, it follows the determinations of the Nomenclature committee of the Society of American Florists. It opposes trinomial nomenclature, and therefore places a comma or the abbreviation* var. *between the specific and varietal names. It uses capital initials for all specific and varietal Latin names which are derived from proper nouns.*

HON. EDWIN WILLITS, Assistant Secretary of Agriculture, has been placed in charge of the government exhibit at the World's Fair. This is the best appointment that could have been made, and assures a broad and comprehensive management of what must be the most important showing at the Columbian Exposition.

: : : :

HENRY L. VILMORIN, of the old and well-known seed firm of Vilmorin, Andrieux et Cie., of Paris, has been making a hasty trip through the east, visiting customers and examining our horticultural industries. His firm is a large exporter to and importer from the United States.

: : : :

T. T. LYON, president of the Michigan Horticultural Society, and one of the best pomologists in the land, has been appointed a permanent special agent of the National Division of Pomology. He will attend the various meetings of state and other horticultural societies, pomological fairs and exhibitions, and will gather and disseminate all the information possible by participating in the discussions and by examining and collecting specimens. He will probably have some special work in the line of reciprocity and co-operation with the national, state and local horticultural societies. This will greatly popularize the work of the division.

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FRUIT IN OREGON.—The horticulturist's prospects are bright. All over the state the fruit crop is larger than for several years past. With one or two exceptions, the entire state is blessed with a full crop of the best fruit. Good prices prevail for green, canned and evaporated fruit. The leading canning and evaporating establishment in our state—the Salem Canning Company—has the following schedule of prices per cwt. for present material: Peas, $1.35; beans, $1.20; tomatoes, 90 cts.; plums, peaches, $1; green gage, Jefferson and Columbia, 75 cts. For evaporating, they will pay $1.50 for the Italians, and pay freight when not shipped more than 100 miles.—PROFESSOR E. R. LAKE, *Oregon.*

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THE B. A. ELLIOTT COMPANY, of Pittsburg, issues a unique and tasty pamphlet and catalogue of "Fall Garden Work," in which particular attention is called to the interesting Japanese irises, and to the importance of planting hardy plants in the fall. They advise to plant everything possible in the fall, as a whole year is saved; not only the spring flowering bulbs, such as hyacinths, tulips, narcissi, etc., as they cannot be obtained at any other season, but many other things. If you are going to raise lilies, plant them by all means in the fall; *L. candidum* should go in just as soon as they can be obtained—the latter part of August or the first of September. Many of the failures in lily growing come from late spring planting.

: : : :

THE OUTLOOK FOR APPLES IN MICHIGAN.—Again will Michigan apples command the high prices of last year, and probably even greater; for our state has the best crop of winter fruit there is anywhere in the Union, albeit the same is not more than half the yield of average years. But western New York has a very short crop of inferior fruit and elsewhere there is little or none, except that in Maine, which has of recent years progressed rapidly as an apple-growing region, the fruit is reported to be in fair supply.

Our latest crop report says that there will be forty-eight per cent. of an average crop in the southern counties, sixty-four in the central and fifty-eight in the northern. This is a loss in condition within a month of forty-four per cent. in southern counties, thirty-eight in the central and twenty-four in the northern. Many correspondents report that the apples have nearly all fallen from the trees, and that in their localities the crop will be a total failure.

So far as we are informed, the most fruit will be found in a belt beginning with eastern Allegan county and extending eastward across the state, including a tract twenty-five to forty miles in width.—*Allegan* (*Mich.*) *Gazette.*

: : : :

PRELIMINARY measures have been taken towards organizing a general horticultural society in Chicago. It is desired to establish it upon a basis similar to that of the Massachusetts Horticultural Society, which is the best horticultural society in the New World. The following persons are the original movers in the undertaking, and they issued the call for the first meeting, which was held August 21: John L. Beveridge, F. P. Cran-

don, C. E. Zimmermann, H. P. Daly, R. Clark, Herman Claire ; Alex. M. Thompson, John N. Young, Alfred Johnson, John P. Reynolds, Henry Lumbard, Geo. Gerts, E. S. Taylor, Geo. Lill, Andrew McNally, C. R. Williams, Andrew Dunning, G. A. Kennicott ; John C. Ure, Jonathan Periam ; Edgar Sanders, A. Harms, L. A. Budlong, Hugh A. White, Hugh Ritchie, A. H. Blackall, A. C . Cameron, D. R. Cameron, P. J. Probeck, Philip Holman, O. F. Dubois, Cuthbert McArthur, J. A. Pettigrew, David Wylie, Alexander Reid, J. C. Craig, E. M. Page.

Temporary officers have been chosen as follows : Jonathan Periam, Chairman ; C. W. Crossman, Secretary ; William H. Chadwick, Treasurer. A committee on permanent organization has been appointed. This committee is instructed as follows : First, to incorporate under the laws of the state of Illinois. Second, to prepare an address setting forth the aims of the proposed organization, which address shall be mailed to such citizens as the committee may deem eligible, from their known interest in horticultural pursuits and other reasons, to be a father to the new enterprise ; together with an invitation to attend a meeting at such time and place as the committee may fix, and to become charter members of this society.

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THE COLUMBIAN HORTICULTURAL ASSOCIATION was organized at Chicago, August 27. The object of this organization is to promote the horticultural interests of the World's Fair, and it is to remain in active operation "until the close of the World's Columbian Exposition," and "all elected officers shall be permanent until the close of the exposition."

The convention which resolved itself into this association was composed of over 50 delegates from various leading horticultural societies in the United States and Canada, who assembled in response to a call issued by the Illinois Horticultural Society. Societies which did not wake up in time to send delegates to this first meeting can secure membership at any future meeting of the association. A resolution was adopted requesting each society represented to contribute $25 towards a "contingent fund to defray expenses of permanent organization." A memorial was adopted for presentation to the National Commission, which sets forth the importance of holding a distinct horticultural exhibition, coördinate with other leading divisions of the exposition. It also urges the Commission to appoint the following officers to superintend the horticultural interests : Parker Earle, Mississippi, Commissioner of Horticulture ; G. B. Brackett, Iowa, Superintendent of Pomology ; J. D. Raynolds, Illinois, Superintendent of Floriculture and Landscape Gardening ; George B. Thomas, Pennsylvania, Superintendent of Nursery and Forestry Products ; J. C. Vaughan, Illinois, Superintendent of Seed and Vegetable Department.

The permanent officers of the association are as follows : President, S. M. Emery, Lake City, Minn. ; Vice President, C. L. Watrous, Des Moines, Iowa ; Secretary, H. B. Beatty, Oil City, Pa. ; Assistant Secretary, G. L. Grant, Chicago, Ill. ; Treasurer, M. A. Thayer, Sparta, Wis.

THE SOCIETY OF AMERICAN FLORISTS convened in its sixth annual meeting in Horticultural Hall, Boston, on the morning of August 19. The number in attendance was large, probably 700 members being present ; but after the first session no meeting had over half the number present. The addresses of welcome were made by the Lieutenant-Governor of Massachusetts and Mayor of Boston, and were responded to by Robert Craig, of Philadelphia. President Jordan's address urged the importance of education to the florist, advised that park and boulevard systems be extended far into suburbs, or even into the country, as a means of educating the masses, suggested that wealthy men emulate the example of the late Henry Shaw in establishing permanent and public horticultural institutions, and spoke of the importance of "some measure of qualification for young men entering into the employment of florists to learn the business."

The secretary made his report, and indicated the membership of the Society as 775, which number paid dues for 1889, and the treasurer's report showed a balance in the treasury of $554 on the first of last July. J. D. Raynolds, of the Nomenclature Committee, stated that instances of dishonest mis-naming of plants are few. Much of the improper nomenclature comes from the mixing of labels and the disregard of botanical nomenclature. "Of the cases of the supposed misnaming submitted, by far the larger number—fully 75 per cent.—are simply cases of mistaken identity." He thought that the experiment stations should not be called upon to aid in determining synonyms, as their officers are not competent to undertake the work. Professor Bailey said that there would be little trouble from incompetence of station officers in such matters as this, but that most of the stations are not yet equipped for undertaking work in floriculture. W. H. Manning, Massachusetts, sent in a sensible paper contending for the adoption of botanical nomenclature, and recommending the formulation of rules to govern the naming of florists' varieties. D. B. Long, Buffalo, read an invaluable paper upon methods of keeping accounts and facilitating business, and the necessity of more systematic business methods among florists. James Dean, New York, discussed the Easter trade. *Lilium Harrisii*, azalea, hydrangeas (especially *H. Otaksa*), cytisus (*C. Canariensis* and *C. racemosus*), hyacinths, tulips, narcissus and lily of the valley are the best plants for the Easter trade. B. F. Critchell named the following as the twelve best house plants for window gardening : *Aspidistra lurida*, var. *variegata*, Chinese or Indian azaleas, calla, *Dracæna terminalis* and *D. indivisa*, *Livistonia australis*, and *L. Chinensis*, *Kentia Belmoreana* and *K. Forsteriana*, *Ficus elastica*, *Pteris tremula*, *Nephrolepis Duffi*. Rob't Veitch, Connecticut, regards the following as the best berry-bearing plants for autumn : *Ardisia crenata*, *Ampelopsis tricolor*, several capsicums, bittersweet (*Celastrus scan-*

dens), burning-bush, several hollies, mistletoe and Jerusalem cherry (*Solanum pseudo-Capsicum*).

Professor Maynard detailed the results of experiments with fertilizers under glass. He recommends for special fertilizers in the house sulphate of ammonia, sulphate of potash, ground bone or bone meal, and dissolved bone black. A spirited discussion occurred upon the paper presented last year at the Buffalo meeting by Wm. McMillan, which severely criticised the absorbing passion for carpet bedding. This paper is working out a great good, as is proved by the fact that its memory is still green, a twelve-month after it was written. Most of the discussion opposed the essay and upheld carpet bedding and massing. The unusually fine carpet bedding in the Boston Public Gardens furnished justification for this view of the matter. A. Gilchrist, Ontario, mentioned the following as among the best native plants for florists' use: *Aquilegia Canadensis*, *Asclepias incarnata* and *tuberosa*, *Coreopsis lanceolata*, *Euphorbia corollata*, *Eupatorium ageratoides*, *Cypripedium parviflorum*, *C. pubescens*, and *C. spectabile*, *Helianthus strumosus*, *Spiræa lobata*, *Nymphœa lobata*, *Rudbeckia hirta* and *R. laciniata*, *Monarda didyma*, *Lobelia cardinalis*, *Solidago odora*, thalictrums, and the trilliums. Jackson Dawson named the following as the twelve best hardy shrubs for florists' use: *Andromeda speciosa*, *Cytisus scoparius*, *Viburnum plicatum*, *Staphylea Colchica*, *Deutzia Sieboldii*, *Exochorda grandiflora*, *Pyrus baccata*, var. *floribunda*, double *Rubus rosiflorus*, *Diervilla* (or *Weigela*) *candidissima*, *Philadelphus latifolius*, double *Spiræa Cantoniensis*, *Kalmia latifolia*. Wm. Falconer advised the culture of the Christmas and Lenten roses. The Christmas rose is *Helleborus niger*, and the Lenten roses *H. Colchicus*, *H. Olympicus* and *H. orientalis*. They can be used either for cutting or as pot plants. For cutting, *H. niger*, var. *maximus* is best. The hellebores can not be profitably managed as outdoor perennials in the north.

E. S. Carman, of *The Rural New-Yorker*, gave a unique and invaluable paper on experiences in crossing plants. Mr. Carman is one of the oldest and best hybridizers in the country, and his paper commanded great attention; at its conclusion the society, through John Thorpe, voted thanks, enthusiastically, to the essayist. It was undoubtedly the best paper presented. The simplicity and ease with which hybridizing could be affected was very clearly set forth, and ridicule was put upon the pedantic use of botanical terms where they would only mystify and confuse. He detailed many of his failures, and then spoke of his many successes, particularly with *Rosa rugosa*, corn, rye and wheat, blackberries and raspberries. He also alluded pointedly to the recent *Rubus phœnicolasius*. The effect of the paper will undoubtedly be to stimulate intelligent effort upon the part of the active florists to hybridize and improve plants coming into their hands. Valuable papers were read by E. S. Miller and J. W. Manning, upon succulents and hardy herbaceous plants respectively.

Many short essays, prepared mostly in answer to questions, were read; but there was not as much live discussion upon points of vital interest as was expected.

Memorials of the members of the Society deceased during the year were read, and eloquent tributes to Peter Henderson and John Henderson commanded especial attention.

The social features of the convention comprised a visit to the estate of Mrs. Francis B. Hayes at Lexington, to the famous grounds of H. H. Hunnewell at Wellesley, and a trip down the harbor with a banquet at Nantasket Beach. All of these were very largely attended—much better than the business sessions of the society.

The Massachusetts Horticultural Society held its fall exhibit of plants and flowers at Music Hall, and all members of the society were admitted free. The exhibition was a remarkable one, perhaps the best ever made in this country. Some of its special features, as the mantel and table decorations, the aquatics, fine crotons, and massings of foliage were magnificent. The very best specimens in the superb private collections of the many horticultural enthusiasts near Boston were here displayed. There was also a most instructive showing of wild flowers and hardy plants, correctly labeled, and the cut gladioli were notably fine. The arrangement exhibited unusual care, although the great hall was scarcely ample for the best display of such a collection. The exhibition alone was well worth a visit across the continent to see; and it is worthy of remark that the local attendance was very large, in contrast to that bestowed upon similar exhibitions in some other large cities.

The usual trade exhibit was held in connection with the Society's meeting, and a variety of articles and stock for florists displayed, in which considerable interest was manifested by the members.

The Society will meet in Toronto in 1891. The new officers are: M. H. Norton, Boston, President; John Chambers, Toronto, Vice President; Wm. J. Stewart, Boston, Secretary; M. A. Hunt, Terre Haute, Treasurer.

THEY SAY

This is an open department for the use of all interested observers, from whom correspondence is solicited on any topic of horticultural interest. Valuable items are frequently crowded out, but all will appear in due time.

Mid-Summer.

They are raking the hay in the meadows,
And the breezes its fragrance are bearing;
In the mid-summer bounty and gladness,
Our hearts are restfully sharing.
In the elm trees down by the river,
I hear the bobolinks singing;—
Their song feels the wings that upbear it,
In its tireless freedom up-springing.

The freshness of spring time is meeting
The fullness of ripening things;
Before and behind him the farmer
Promise and recompense brings.
Kindly the heavens are bending,
Like the roof of a home, o'er his toil;
Swiftly God's messengers hasten
To nourish and quicken the soil.

For "He waters the hills from His chambers,"
And sweeter our blessings are seeming
When the radiant warmth of His goodness
In dewdrop and sunbeam is gleaming.
And now, with His quickening impulses,
The beauty around us is thrilling;
In the mid-summer's lavish out pouring,
With mercies our lives He is filling.

—OLIVE E. DANA.

Controlling the Yellows.—"Horace E. Griffin, yellows commissioner for the township of Casco, this week made an examination of the orchards of Mrs. Hiram Griffin and Mrs. Stowe, and of the three thousand trees, he found not a single indication of the disease. In some of the orchards he found symptoms of yellows, but not to so great an extent as to cause any alarm, it being generally attended to as soon as seen."—*South Haven* (*Mich.*) *Sentinel.*

This is now the common experience in the Michigan peach region, although it is but a few years ago when growers there were on the point of despair because of the ravages of the yellows. Persistent and united action in eradicating the disease has brought about this happy state of affairs.

Profit on Currants.—J. B. Emery, of Riverside, Mich., found his currants a profitable investment this year. He hauled seventy-five cases of currants to the boat in one load, consigned them to himself, and placed them where he thought they would do the most good. They sold for $150, giving him a profit of $125.50.—*Allegan* (*Mich.*) *Gazette.*

The Concord and Hartford Grapes.—To say that there is "no longer any excuse for planting the Concord," as Dr. Hoskins does in the July GARDEN, is to get about as wide of the mark as possible. Few people in other states have any conception of the marvelous success and popularity of this grape in the seven lake towns of Chautauqua county. Don't pass judgment on the Concord till you have seen Chautauqua Concords. For the general grower here, the Hartford has merits. It is ten days earlier than the Concord, remarkably prolific, and when well grown is of passable quality. To begin the season with a half acre of Hartfords is fully as profitable as the same area of Concords, which are marketed at a lower price.

About 6,000 tons of Concord grapes were sold from this county during the season of 1889. There were 500 full car-loads of about 12 tons each. I do not mention these figures to boom this grape section; only to point out some pretty substantial reasons for planting the Concord. If the rate of increase in grape production of the past ten years is kept up for ten years more, the year 1900 will see from this county the annual grape product worth several million dollars.—S. S. CRISSEY, *Fredonia, N. Y.*

How to Cook Cranberries.—*Recipes Adopted by the American Cranberry Growers' Association.*—1. Wash them. Wash them clean, and remove all stems and leaves.

2. *Always* cook in a porcelain-lined kettle or stew-pan. *Never* cook in tin or brass.

3. The sooner they are eaten after cooking, the sooner you will know how good they are.

SAUCE NO. 1.—*1 quart berries, 1 pint water, 1 pound granulated sugar. Boil ten minutes; shake the vessel, do not stir.

SAUCE NO. 2.—*1 quart berries, 1 pint water, 1 pound granulated sugar. Bring sugar and water to a boil; add the fruit and boil till clear—fifteen or twenty minutes.

SAUCE NO. 3.—1 pound berries, 1 pint (scant) cold water, ½ pound granulated sugar. Boil together berries and water ten minutes; add sugar and boil five minutes longer.

STRAINED SAUCE.—1½ pounds berries, 1 pint water, ¾ pound sugar. Boil together berries and water ten to twelve minutes; strain through a colander and add sugar.

CRANBERRY JELLY.—1½ pounds berries, 1 pint water.

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*This means a full, heaped dry measure quart, which should weigh full 17 ounces.

Boil fifteen minutes; strain through jelly bag or coarse cloth; cook the juice fifteen minutes; add as much sugar as you have juice and boil again fifteen minutes, and turn into forms or jelly cups; dip forms in cold water to prevent sticking.

CRANBERRY TARTS.—Either of the sauces above will make delicious tarts. Strained sauce generally preferred.

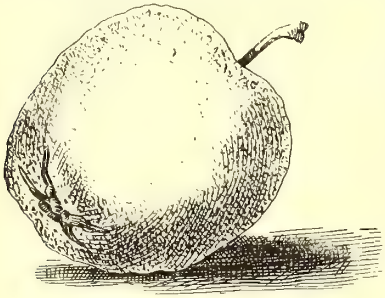
CRANBERRY PIES.—For pies with upper crusts the berries should be used whole, and cooked in the pastry in the following proportion: 4 parts berries, 3 parts sugar, 1 part water.

STEAMED BATTER PUDDING.—Stir the cranberries with a light batter; steam two hours; serve with liquid sauce.

STEAMED CRANBERRY DUMPLINGS.—Use cranberries the same as apples; steam about one hour, and serve with sauce.

FROZEN CRANBERRIES.—Some prefer the flavor of frozen cranberries. Freeze them solid and throw into hot water; use one-fourth less sugar than in former recipes.

The Bloomless Apple.—Discussions and figures of the so-called bloomless apple appeared in this journal for last January and July, 1889. Robert Manning, secretary of the Massachusetts Horticultural Society, who called my attention to Duhamel's figure of the Fig apple (p. 7, January issue), has lately placed in my hands an account of the variety by Dr. Diel in his "Kernobstsorten," published in Germany in 1804 (Vol. 8). The character of bloom appears to be the same as in the instances already discussed, but the shape of the apple, if the drawing is correct, is somewhat different from the others. Diel calls the variety "bloomless fig apple" (*Feigenapfel ohne Blüthe*). He gives many old references to it, showing that in Europe this singular variation has been many times recorded. Dr. Diel's figure is reproduced here, and may be compared with former prints.



DIEL'S FIG APPLE.

In the Gray Herbarium, at Cambridge, I have lately seen flowers of this bloomless apple collected many years ago at Montague, Mass., and Hagerstown, Md.—L. H. BAILEY.

Centralia Fruit Shippers.—The Centralia (Ill.) Fruit Shippers' Association met in the city hall in the city of Centralia, July 19th, 1890, to settle up the association business with the loader and the unloader, and to adjust the bills and business pertaining to the past strawberry season.

The president and secretary were instructed to make and have published a report of the business done this season and the amount saved over past years, which is as follows:

"We find from the report of the unloader that we shipped to Chicago by the J. S. E. and Wabash railway, 77 cars, containing 43,436 cases. Expenses for telegrams, loading, unloading and freight on 77 cars, $6,718.20.

"In comparing our reports of this season with our reports of the past, we find that the association has saved about five cents a case over past seasons, which, on a light crop of 77 cars, amounts to $2,171.80."—J. WEBSTER, *Pres.*

Evaporating Fruit.—Sladden & Son, of Eugene, Oregon, have a bearing prune orchard of 2,500 trees, in which they take much pride. For some time past this firm has sold all the evaporated fruit from this orchard for 10 and 12 cents per pound, and this year they have received orders for 16 car loads more than thay they can furnish. For this entire amount they would have received 12 cents per pound. These figures, being considerately above the average prices paid for such goods, have lately elicited much comment and inquiry, the outcome of which has been the ascertaining of the methods adopted by these men in the evaporating of their fruits. Their practices are entirely different from those usually followed. They use no lye to eat the skin so that drying will be facilitated; they use no sulphur; they have no sweating process. They simply put the prunes into the dryer for 12–18 hours, with a rapidly circulating current of air at 150° F.; then put them into barrels, cover them to exclude dust and keep flies out. The prunes are left in the barrel for about six weeks, and then they are put into five and ten pound boxes, neatly packed, wrapped and labeled. In this condition, Messrs. Sladden say they have known their fruit to keep for three years and be in just as good condition as when first packed. Certain it is, that samples shown the writer, said to have been put up in this manner, have a delicious fruity odor, are sweet, juicy and bright.—E. R. LAKE, *Oregon.*

Cross-Fertilization of the Grape.—It has been said that no winged insects have been seen visiting grape blossoms. This season, while hoeing near a grape vine, I heard the humming of a bumble bee and went to the vine to see what it was doing. I saw first one of those small bees that burrow, some in the ground and some in the dead stalks of plants, and because some of the species burrow in dead mullein slalks, they are, in this section, indiscriminately called mullein bees. This bee was at work on the grape blossoms, flying from cluster to cluster with all the nervous eagerness that is characteristic of bees while gathering food. The bumble bee I saw alight on a cluster of blossoms and crawl around it two or three times, but with moderation, as if her visit there was experimental. I at once went to another vine and there saw two of the "mullein" bees eagerly at work on the blossoms. Surely these three bees alone could have pollinated hundreds of blossoms in one day, even though some of them were a mile apart.—J. T. MACOMBER.

Three Good Russian Plums.—We have grown Moldavka larger than Lombard, and when it ripens on the tree it is a far better plum. The tree is an iron clad, where Lombard is as tender as a peach; a heavy bearer, never rots, and the curculio and gouger let it alone almost entirely. (See Fig. 1.) The Early Red grows away up at Winnipeg—the hardiest of the hardy. It also is of fine size and excellent quality. (Fig. 2.) The leaves are small and thick, letting the sun into the tree and fruit, yet the wood never sun-scalds and the fruit never rots.

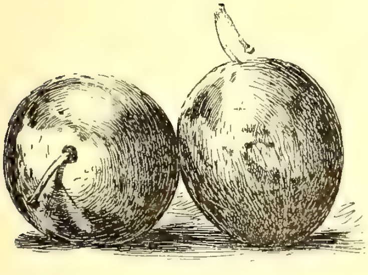


FIG. 1. MOLDAVKA.

The Voronesh Yellow gets as large as Bradshaw, is pear-shaped, and of prime quality for any use. (Fig. 3.) The tree is perfect in the northwest. A mistake was made in my last year's bulletin, in saying that the fruit of this fine variety is round. The true Voronesh Yellow is always distinctly pear-shaped.—J. L. BUDD, *Agricultural College, Iowa.*

Preserving Fruits.—The fruits in the exhibit of "California on Wheels" are said to be preserved as follows: Thirty gallons of filtered water are placed in a barrel, and on the water is placed a tin pan containing 25 cents worth of sulphur. The sulphur is set on fire and the top of the barrel is covered with a piece of oilskin so as to retain the fumes. When the sulphur burns out the covering is removed, allowing the supply of oxygen in the barrel to be renewed, and after stirring the water, the sulphur is again set on fire and the top of the barrel covered. This operation is repeated until the sulphur will no longer burn, when the water is ready for use. Not only are fresh fruits preserved in this water, but where decay has set in it is completely checked, and withered fruits have their plumpness and color restored.

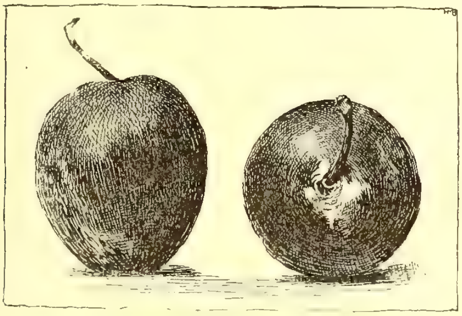


FIG. 2. EARLY RED.

How to Grow Grapes.—The back-yard where I live is full of grape vines. A row on one side covers a high board fence. Three vines run rampant over the tops of some tall trees. The remainder, situated in an open space, are trained to short stalks or trimmed into low bushes without support. The grapes on these latter vines are much exposed to the sun, and produced near the ground, while those on the former hang high under a canopy of leaves.

The difference in the amount of fruit produced in the two situations is striking. Curiosity prompted me to count the berries on one hundred clusters in each case. I tried to be fair and select average representatives. One hundred clusters from the pruned vines contained only 141 berries, or an average of less than two to each cluster; thirty-eight of these clusters bore no perfect berries, and the highest number on a cluster was ten. One hundred clusters from the unpruned vines contained 1247 berries, or an average of over twelve to each cluster; the lowest number on a cluster was two and the highest forty. The injury to these grapes was caused by the black rot.—A. A. CROZIER.

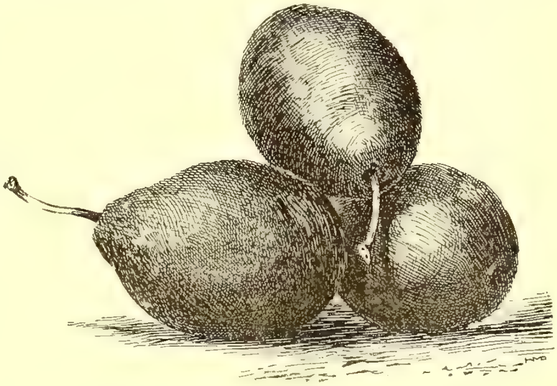


FIG. 3. VORONESH YELLOW.

Cassava Culture.—I find no more trouble to protect the cassava stubble for winter protection than the sugar cane. I have a patch now, the second year planted, that is doing nicely; the roots or tubers are fairly beginning to crack the ground. Last year I made roots five feet long and four inches in diameter. I suppose these same roots will double in size this year, and continue on from year to year as long as I protect the stubble. I find that the cassava can be planted any time.

I have had better success by planting in the fall, and cover two or three inches with a plow, and box off in spring when the sprouts begin to show up. It can also be set out through the summer, as the stalks broken or cut to pieces and set out perpendicularly, readily strike roots as well as the sweet potato, and can be multiplied rapidly.

I believe the cassava can be successfully cultivated as a perennial plant as far north as Arkansas, and treated as an annual, can be successfully cultivated much farther north. Many seem to think because it comes from the tropics that it will not do above the frost line This is a mistake. Tobacco is a tropical plant, and yet it produces well as far north as Kentucky, Connecticut and Virginia.—J. L. NORMAND, *Marksville, La.*

Handling Tomato Plants.—When going home from the city market, I generally drive out an alley, and can almost always pick up a wagon load of tin cans before I get out of town; mostly of the size in which corn and tomatoes are packed. These I throw down in some out of the way place until I have gathered together as many as I need. During the winter when not very busy we build a fire between two logs, and when we have a good bed of coals, throw on a bushel or so of cans. In a very short time the tops and bottoms drop off and the sides pop open, and with a long stick we toss them out. Some fine wire is then procured and pieces cut just long enough to make a loop to fit over the can. The sides of can should be lapped about three-fourths of an inch. The natural spring of the can will hold the wire on. The cans are all prepared in this way and stored in a shed until wanted in the spring.

About three months before it is safe to set plants in the open ground we start the plants in a hot-bed. In about six weeks the plants will be three or four inches high, when a milder hot-bed is made, and the cans set in as thick as they will stand and filled with rich soil. Into each of these cans is set one plant, where it is allowed to grow four or five weeks. When they begin to crowd they should be separated, so as to have plenty of room, and let stand until safe to plant out. When the ground is marked off, throw out a spadeful of soil where each plant is to grow, and apply a little bone-dust or other fertilizer.

Now lift the plant, can, soil and all, and set in boxes convenient to handle, and haul to the field; set can and all into the hole, so that when the soil is drawn in, the surface will be about an inch higher than the can. Cut the wire with a nipper and lift off the can, hoe in the soil and the work is done. It is a good plan to wet the plants well before lifting from the bed. In this way I have often made a good thing off an acre of plants before others have any to sell. A good deal depends, however, upon the variety. I used to grow the Acme, but lately I have used Livingston's Beauty.—F. G. JOHNSON, *Columbus, O.*

Pickles and Preserves—*Canning Corn.*—Those who have had trouble in keeping canned corn should try the following recipe: Take corn as soon as it is old enough for roasting (if too old the kernels will be hard). Cut it from the cob, taking care that none of the latter is taken in your desire to get all the corn. Pack it into glass jars, using something to pound it tightly down. Put on the tops without the rings, and screw them down, but not so tightly as to prevent the escape of air. Place them in a boiler with something between them, and fill it with cold water nearly to the tops of the cans. Cover the boiler, and let the water heat gradually to the boiling point; boil steadily four or five hours. A pailful of the corn should be cooked with the rest to replace that lost by shrinkage in the jars. Put on the rubbers, screw on the tops tightly, and keep in a cool, dark place. It will keep.

To keep Pickles Green.—Put the cucumbers in strong brine as fast as they are gathered from the vines. When you have enough drain off the brine. Line a kettle with the young leaves of grape vines and put in the cucumbers, throwing away any that have turned soft. A little powdered alum, in the proportion of a teaspoonful to a gallon of cucumbers, should be sprinkled in. Add a little water, cover them closely, and steam for several hours. Don't boil at all, nor let them come to the boiling point, but just keep them steaming. When green enough, pack in stone jars and pour over them boiling vinegar, to which has been added sugar (one teacupful to a gallon), a few whole peppers, cloves, allspice and a little celery seed. Pour the vinegar off and reheat every week for four weeks. Cover the jar closely, putting a weight on the cucumbers to keep them under the pickle; they are very nice.

Sweet Pickled Cucumbers.—Select ripe cucumbers of uniform size, pare, and remove the seeds. Make brine strong enough to support an egg, pour over the cucumbers and let them stand nine days, stirring every day. Then soak them in clear water in which has been stirred a teaspoonful of alum to each gallon of water, for thirty-six hours. Make a syrup of one pint of good vinegar, one pint sugar, half a teacupful of water, two tablespoonfuls each of broken cinnamon bark, mace and pepper grains. Let the mixture boil, and drop in the pieces of cucumbers; cook till tender, but be careful not to let them get soft. Remove to a jar; when all are cooked, pour the syrup over them and tie closely.

Watermelon Rind Pickles.—Pare the rinds and trim off all soft places; cut in the desired shape, remembering they will shrink considerably in cooking. Sprinkle a very little salt over them, and let them stand over night. Then soak them a few hours in clear water. Steam them until a fork will go through easily, and then drain off every bit of water. Put them in a stone jar and pour over them the prepared vinegar, which should be ready and waiting on the fire. Use about three pounds of sugar to two quarts of good vinegar; put in a sliced lemon and whole cloves, and use cinnamon to taste. Let it stand a few days, then turn off and reheat; it may be necessary to do this several times if the weather is very hot.

Citron Preserves.—Peel the citron and slice about half an inch thick. Cover the slices with cold water, adding a handful of salt to each large pailful. The next day drain off this water, weigh the citron, and put it to cook in clear water. Boil until a broom splint will easily pass through it; drain well, and to each pound of the citron as before weighed, put half a pound of white sugar. Boil slowly until the citron is perfectly transparent, and the juice forms a thick syrup. When cold, flavor with extract of lemon and cover closely.

Green Tomato Sweet Pickle.—Pick large green tomatoes, being very careful not to break the skin; put them in very strong brine and let them lie any length of time until it is convenient to attend to them. Sometimes I leave mine until December. Take them out of the brine and cover with clear water; set on the back of the stove and keep warm, but don't let them boil on any account. Keep changing the water, letting it heat up each time until they are fresh, by which time they will also be soft enough. Put them in the pan and pour over them the hot vinegar prepared as for any sweet pickles. They are splendid.

Butternut Pickles.—Gather the nuts before the shell is woody; when a large needle can be thrust into them they are still sufficiently tender. Make a strong brine and while boiling hot, turn it on the nuts. Let them stand in the brine nine days, making fresh brine every three days. Place the nuts on a sieve to drain, leaving them until they turn black. Ascertain the amount of vinegar required to cover them, and to every quart allow half an ounce each of mace, cloves, pepper and mustard seed, and an eighth of an ounce of ginger root. Steep the spices in the vinegar, and turn it boiling hot on the nuts. Repeat this boiling process every day for three days.

The Defoliation of Trees in Autumn.—The phenomenon of rapid defoliation in the fall is one which may be often observed in our common trees. The causes at work are not a little mysterious, but some understanding of them may be gained by considering the method of formation of the separating cork-plane. This cork-plane begins to be formed sometimes as early as the summer, and by autumn extends almost entirely across the leaf-stalk. All that is needed to insure complete severance is the formation of a few more cells, and the ripening of the whole into a readily separable condition. A sharp frost seems to hasten this final process in a very effectual manner, for, so far as we have observed, it is just after a "cold snap" that we have the most marked defoliation. The exact way in which sudden cold acts to put all parts in readiness for the separation is not clear, but it may be fairly surmised that its effect is felt not so much in the production of new cells as in the ripening of those already formed. All who have prepared specimens for an herbarium know that, with many plants, the leaves separate from the plant spontaneously during drying. This shows clearly that cold is not necessary to the process of defoliation, and leads us to make the suggestion that it may be a dryness that comes with the cold, rather than the temperature itself, which gives the final touch.—F. L. SARGENT, *in Popular Science News.*

An English Growl.—The apologists for the "common" or "popular" names of plants, as against scientific designations, can take comfort from the following:

Between "the language of flowers," as understood by the young people, and the terminology of the florist or scientific botanist there is a world-wide difference. It may be that "the rose by any other name would smell as sweet," but most people prefer the homely names of flowers to the incredible jargons in which scientific horticulturists revel. At the Royal Horticultural Society the chairman of the scientific committee exhibited drawings and specimens of the flower of a perfectly new plant, a "bigener," a sort of hybrid between two such dissimilar parents as the raspberry and the strawberry. Of this strange addition to the vegetable world, we are told that "it is generally considered to be *Rubrus Leesii Bab.*" We do not dispute this statement, but when we are further told that "pedicel and sepals are finely setose, that it wants the epicalyx of the strawberry, and, moreover, that the carpels are not glabrous," we are lost in admiration of the copiousness of the English language. Of another remarkable hybrid, a cross between the black currant and the gooseberry, which was shown at the same meeting, we are told that "the foliage resembles that of the gooseberry," rather than of the other parent plant, which is clear enough; but what are we to understand when, in further description, we are informed that "the infloresence is a many-flowered raceme," "the sepal lobes erect, the stamens contabescent, and the 'style' villous?" But there are profounder depths yet in these technical descriptions than any we have quoted. Two botanists, the other day, were growing warm over an argument in reference to "the septicidal dehisence of a pericarp between the laminæ of the dissepiment." Here, in sadness be it said, we feel compelled to draw the line. The "style" is "villous," or, as we should prefer to call it, villainous.—*Evening Standard* (*London*).

Two French Entanglements.—Two interesting and somewhat amusing notes concerning America appear in a late number of a French horticultural journal (*L'Illustration Horticole*). The one speaks of the mystic nymphæa of the Nile, with leaves pubescent beneath, and flesh-white blossoms, as being found in great abundance in the marshes southwest of Chicago! It also states that it has been proved beyond a doubt, that more than two centuries ago the aborigines of America ate the root of this lotus, roasted in ashes. As it was first mentioned by a Frenchman who visited this region in 1671, a trifle more than two centuries ago, no doubt the information has descended in direct French line to the present time!

The other note refers to our struggle for a national flower, and may be translated as follows: "After political flowers, such as the royalist *fleur-de-lis* and the imperial violet, come the national flowers. The chrysanthemum, the symbolic flower of Japan, gives Americans no rest. The United States is even now seeking a national flower. Some propose the hawthorn, which would be very charming; others dream of the laurel, which would perhaps be a trifle arrogant for republicans; while others—and they are, we are assured, the most numerous—give preference to the *cytise.*" "Cytise" is the French for "false ebony," or American ebony, as it is sometimes called. It is more commonly known as laburnum, and is also called "golden chain." It looks as if our friends were getting tangled up between the "golden chain" and the "golden rod."—C. S. Valentine.

Satsuma Orange.—In reply to your correspondent's question as to the Satsuma, in Aug. issue (p. 491), permit me to say, I am not a stranger to the trifoliata stock. I have also worked the Satsuma on the sour orange, the sweet, and on the lemon. The peculiar death cold, so still, on the morning of March 17, 1890, was no respecter of varieties, when it caught them with the full flow of sap up. Trees which had been irrigated had been growing all winter; all the stored forces of the whole tree had been pushed into the new wood in the top. I had thrifty Satsumas well set with oranges. They were killed branch and root, as thoroughly as the lightning recently killed bignonias fifteen feet high for me. There was a strong similarity in the way the leaves withered. The *Allamanda regina* had been in constant bloom for eleven months, and had hundreds of blooms the 16th of March. The vines or canes were more than an inch in diameter. The cold killed it. I cut it close to the ground; since then it had grown ten feet high, was full of its pure yellow bloom. The sheet of lightning swept over it, and it withered away, burned by heat. But as "lightning never strikes twice in the same place," we are devoutly thankful to a merciful Providence which spared our lives, and it seemed the converse is sometimes true of the mediæval monk's saying: "*Mediæ vitæ in morte seemus.*" When the breath of electricity passed along one side of an orange tree the leaves and fruit were burned, and outwardly looked like the burning of frost—only this difference—the electricity caused the more rapid decay of leaf and fruit.

By the cold of March 17th, I saw "willows by the water courses," which were a quarter of a century old, killed to the ground; maples and gums which had been in leaf a month badly frozen back; also hickories, pecans and persimmons. In the same conditions, under a vigorous growth with a full flow of sap, a hickory would stand no more than an orange, and scarcely more than a tomato. The only Satsuma which I think is worth growing is a seedling from a single, one of the first fruits I ever saw of that variety. It has great stamina, is prolific, and not a *shrub*, but a tree, nor is it more liable to attacks of insect pests than the ordinary seedling, while the imported bears the palm for a home for soft scale, and under favorable weather, for the mealy bug. The fruit, too, of the seedling, under the analytical scale of the State Horticultural Society would leave the fruit from the imported variety in the low list comparison. Not unfrequently looks or color go a great way in sales. I knew a hybrid of a tangierine and the old rough loose-rind wild lemon once to sell in Boston for $10 per box. They were flat and insipid, but they were red. Two boxes broke the market; and though that was twelve years age, I do not know of a sale ever being made again. A few boxes of Satsumas would do the same thing. Satsumas planted at the same time, side by side, with the Jaffa and Majorca, with precisely the same treatment, do not produce a fifth as much in net results.—Lyman Phelps.

Size of Satsumas.—Did not J. H. McF. (page 491) make a slip of the pen in his account of the size of the Satsumas? An orange so small that 625 only a little more than filled *half a box* could not be much larger than a large hickory nut or a black walnut. The Satsuma, as I have seen it, averages larger than the Mandarin, which usually runs from 200 to 350 to the box. I do not think that I have ever seen a Satsuma smaller than 300 to the box, and most of them would run up to the neighborhood of 200 per box.

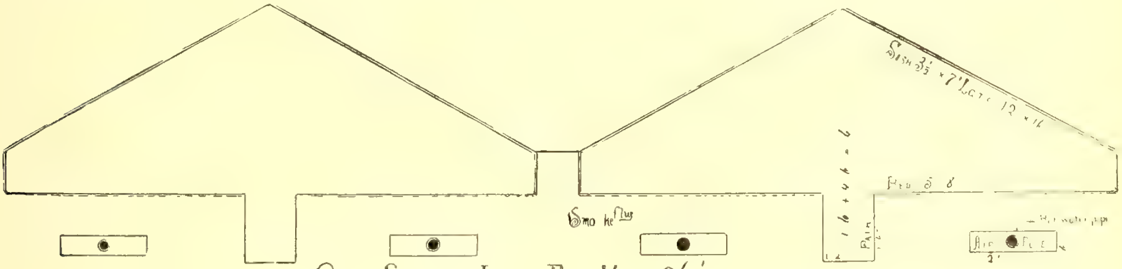
As to its hardiness, last spring's experience in Florida furnishes no criterion by which to estimate its true standing. No tree is hardy when in full vigor of growth, and every twig tipped with young tender growth. A few days after the frost of March 17, I was out in a large hammock near here. The tops of the hickories, sweet gum and other deciduous trees, which had just got well leaved out before the frost, looked as though a fire had swept through them. On my own place fig trees were killed almost to the ground by a temperature of 26°, which only lasted part of one night, that went through the freeze of January, 1886, unhurt, when the *ground* froze, in the shade, for four days, and the mercury played up and down between 20 and 30 all that time! As the Satsuma trees were growing vigorously at the time of the freeze in March, 1890, and covered with new tender growth, they could not possibly escape injury. Yet they suffered less than most varieties under similar conditions.—W. C. Steele, *Florida.*

A Yeoman of Henry Seventh's Time.—My father was a yeoman, and had no lands of his own, only he had a farm of £31, or £41, by year at the uttermost, and hereupon he tilled so much as kept half a dozen men. He had walked for an hundred sheep, and my mother milked 30 kine. He was able, and did find the king a harness, with himself and his horse, while he came to the place that he should receive the king's wages. I can remember that I buckled his harness when he went to Blackheath field. He kept me to school, or else I had not been able to preach before the king's majesty now. He married my sisters with £51, or 20 nobles a piece, so that he brought them up in godliness and fear of God. He kept hospitality for his poor neighbors. And some alms he gave to the poor, and all this he did of the said farm. Where he that now hath it, payeth £161 by the year, or more, and is not able to do anything for his prince, for himself, nor for his children, or give a cup of drink to the poor.

In my time my poor father was as diligent to teach me to shoot, as to learn me other things, and so I think other men did their children; he taught me how to draw, how to lay my body in my bow, and not to draw with strength of arms as divers other nations do, but with strength of the body. I had my bows bought me according to my age and strength; as I increased in them, so my bows were made bigger and bigger, for men shall never shoot well, except they be brought up in it; it is a worthy game, a wholesome kind of exercise, and much commended in physic.—*An old English Preacher.*

Improved Plant House.—After an examination of many hot-houses, and much study of methods of heating, a plant house has been designed and built which I think is a great improvement. The rafters and caps are of original design, and the entire arrangement is a combination of the best principles of hot-house construction. The joints are so fitted as to exclude more of the cold air than in other plans. The plants are nearer the glass. The mechanical work, except setting boiler and fitting pipe, is all completed in the sash factory, and may be readily set up or taken down by any farmer alone. The beds are five feet six inches wide, and may be cultivated by horse power, if desired, in the fall, the roof put on and used for winter crops until early spring, when the beds may be planted with tomato, egg-plant, or cauliflower plants much earlier than would be safe outside; and after all danger of frost is past, the sash, caps and rafters may be piled out of the weather, and the crops cultivated and matured in advance of field crops.

I have one house 26x124 feet, which I enclosed about the middle of last January over several inches of frozen ground, and set with several thousands of plants as fast as the ground was thawed, and carried them through the severe weather ranging from 6° to 30° below the freezing point, with less than one-half the heating power used in other houses. From the 1st to the 9th, and from the 13th to the 15th of February, when the thermometer ranged from 1° above to 12° below freezing at sunrise, we had no fire in the heater, the warmth in the ground, with the sunlight, being sufficient to keep the plants growing well. It is more convenient to work than most plant houses, costs 25 per cent. less to build, and more than 50 per cent. less heating power than those of other plans. The ordinary hot-bed sash may be used, and farmers who grow their early plants with heating manure would find this house much more convenient and economical to work, as planting and cultivating may be done during the stormy or coldest weather.—RUDOLPHUS BINGHAM, *Camden, N. J.*



Cross Section of Improved Plant House 26' wide

Some Hints about Insects.—Some insects, the common green aphis or plant louse for instance, are so nearly omnipresent that it is scarcely within the range of possibility to do anything more than keep them in check. Others can be exterminated by using the proper means. Perhaps the mealy bug cannot fairly be classed among the later, yet I think in small collections of plants it is entirely practicable to get rid of it. From my observations of its habits, I think it rarely, if ever, stays in the soil in the winter, unless where bottom heat is given, but in summer it works at the roots of the plants as well as at the tops, and is often found in the cracks and corners of pots, etc. The best time, therefore, to exterminate it is in the winter, and all that is necessary is to pick off and crush every one that can be found, say once a week, and then wash the plants thoroughly with strong soap suds. Follow this treatment *persistently* until none can be found. After this carefully examine the plants once a week, for several weeks, to make sure that no bugs have escaped. These insects are apt to get into the axils of the leaves and it is sometimes difficult to pick them out without breaking the leaves. In such places I use the point of my pocket knife. If any of the leaves of the infested plants drop they should be carefully picked up and burned or otherwise destroyed, as they often have some of the small insects on them. An old newspaper should be spread underneath the plants while picking off the insects, as some will occasionally be dropped when handling the plants, but by this means they can be easily collected and destroyed. Whenever soil, sand or moss has been used to set the pots on, it should be replaced with new once or twice a year, the old being carefully cleared out.

The black aphis or chrysanthemum fly, which is about the worst pest the grower of these plants has to contend with, can be got rid of in the same way. I think if all the chrysanthemums were wintered out of doors, there would be no trouble with this insect; but a very few, kept over in the greenhouse or cellar, will furnish enough of these pests in the course of the season, to spoil a large lot of plants. This insect requires to be treated in the same manner as the mealy bug, except that as it works wholly above ground, summer is the best time to destroy it, or rather spring. It is especially liable to be shaken from the plants in handling, and after all seem to have disappeared, a straggler may crawl up or get carried up by the ants, and before one is aware of it another colony will be well under way. As everything of this kind increases faster in summer than in winter, twice a week will not be too often to examine and clean the plants.

Another item which applies to both, is, that florists seldom try to do more than "keep down" insects. Perhaps anything beyond this would be impracticable in a commercial establishment, and therefore whenever any new plants are purchased, they should be kept in quarantine long enough to ascertain if they are infested. If tobacco soap is obtainable, it is better for cleansing them than any other.—WM. F. BASSETT, *New Jersey*.

Old Plant Lore.—In pre-Linnæan botany plants were valued chiefly for their medical properties, and little attention was given to those that had no "virtues," other than form and beauty. In the description of plants, the last note, and the most important as well, was the table of virtues, and it must be admitted that some of the plants now considered worthless had most remarkable medical properties. They also had the remarkable power of changing dispositions and characters. Where plants are not known to possess any medical virtues they are dismissed like the iris, by Parkinson in his "Garden of Pleasant Flowers," 1629, as follows: "There is not anything extant or to be heard, that any of these kinds of Flower-de-luces hath been used to any Physical purposes, and serve only to deck up the gardens of the curious."

In an old Herbal written by Johannes Mediolano, a celebrated doctor at the Academy of Salerno, we find some very curious plant attributes. Rue, for example, according to the learned doctor, merits all sorts of consideration. "It diminishes the force of love in man, and, on the contrary, increases the flame in woman." "This plant clears both the sight and the perceptions of the mind, when eaten raw; but when cooked, it destroys fleas." This aphorism was put forth and respected by all the old physicians, and people were advised to use rue according to their needs; "if you fall in love imprudently, and, by a strong effort of your own good sense, or by advice of sincere friends, you perceive your folly, eat your rue raw; if you are tormented by fleas, boil it."

Valuable as rue may have been it was nothing in comparison to sage. Sage, according to the school of Salerno, preserves the human race. Among its other virtues, "it cureth the Palsie; healeth filthy wounds and sores; griefs of the liver; drink it with wine to procure an appetite, and strengthen the stomach; for pain in the sides, and shaking of the hands by palsy; to comfort a hot liver, and put away frenzy; to heal scurf, ulcers and venomous bitings; to make the hair black; to comfort the hearte and asswage headach; it strengthens weak members; cureth bitings of mad-dogs; to warme and strengthen aged cold sinews, and lengthen the strength of the younger." It is highly recommended, "when being beaten and juiced it is put to a roasted pigges braines, with currans for sauce thereunto." After a list of more than one hundred virtues like these enumerated, this learned doctor seriously exclaims: "How can it happen that a man who has sage in his garden, yet ends by dying." His philosophy came to his aid, and he replied: "It is a proof of the necessity of death, which nothing can enable us to avoid."

This good old doctor in speaking of walnuts said, 'The first walnut is good, the second iujurious, the third kills." Modern walnuts do not have the same effect.

Now comes a maxim full of good practical sense, and as appropriate now as 350 year ago. "Wash your hands often," says the learned doctor Johannes, "wash your hands often if you wish to live in good health. Wash your hands after meals; it clears the sight." Very impressively he then adds: "To wash the hands, not only promotes health and clears the sight, but it also, incontestably cleans them." Of course a few sage leaves are to be added to the water.—LINNÆUS.

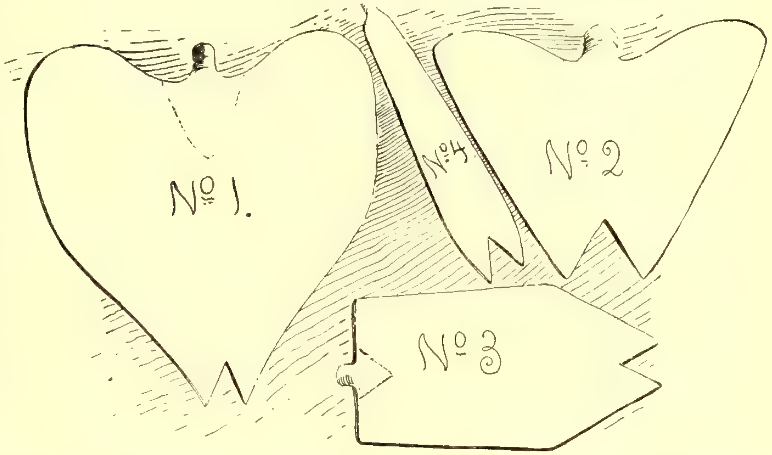
A Durable Walk.—The flower beds and the green lawn do not constitute the main features of a garden by any means; there is another which should be foremost in receiving our attention and labor, and that is the garden walk. One is not ready to realize this, unless a garden has been viewed in which there are good walks, made well, serviceable, and comfortable to the feet, which are artistic and turn in a manner that will not unnecessarily rob the garden of its greensward or of an additional flower bed. Too much walk will deprive a garden of its look of fullness and richness, and too little will add inconvenience and will ofttimes be the cause of a worn sward by the visits to the beds.

A good substantial garden walk and pathway that will prove impervious to hard rains and stand hard travel can be made by following out these instructions. Procure a load or two of medium yellow gravel, or the quantity that you think will suffice, and get it well screened or sifted. Sink your walk at the sides by scraping, and elevate the middle with the large gravel that remains after sifting. This will allow for a good and clear gutter. Roll well with a hand roller and spread a layer of fine screenings. Sprinkle freely with a hose and roll continually. You can the next day perform the same operation of spreading a layer of fine gravel, sprinkling and rolling well. A nice curve should thus be given the path which will shed the rain thoroughly, will have a nice clean appearance, and will be durable.

Remedy for Cabbage Pests.—I keep my cabbage free from all insects by applying very sour milk about sundown every few days.—F. H. COE, *Columbus, O.*

Shade Trees versus Crops.—I have recently seen an editorial in some agricultural journal which took the broad ground that farmers could not afford to plant shade trees by the road-side, because the trees take so much nourishment from the grass and grain. But the article admitted their advantage to the traveling public. I fully appreciate the necessity of securing a supply of bread and butter, as well as something to wear, but it is well to bear in mind that "it is not *all* of life to live." I think something may be done toward growing good crops even under trees. I have a plot of ground adjoining a fine grove of oaks, which are 35 to 40 feet high, and for several years these had been robbing this plot until very little would grow within two rods of the trees. In the autumn of '85 I had a trench two and a half feet deep dug along the border, and in the following spring the plot was planted to blackberry root cuttings. The cuttings which were planted under the shade of the trees grew even better than the others, and the plants this season exhibit the same improvement. Last summer I had a field of sweet potatoes, on one side of which was a row of trees—in part English beech, in a hedge-row, and the rest chestnut. Several rows of potatoes next these trees were nearly ruined, and the past spring I had a trench cut along the line of beeches, and planted sweet potatoes again. The result is, that the plants are growing finely near the beeches, and several rows next the chestnuts are failing, as they did last year. I suppose that eventually there will be a new set of roots from the trees, and the trench will require opening. Perhaps I should have said that, after cutting the roots, the earth was at once thrown back. Possibly a deeper set of roots might ultimately throw up feeders to the surface, but I think in that case they might be severed by a tree digger, or a thorough subsoiling might tear them up.—Wm. F. Bassett, *Hammonton, N. J.*

Improvement in Hoes.—Noting A. B. Tarryer's forms of weed hoes (May, p. 263), I send you outlines of the blades of four hoes I have made and used in my own work. It will be observed that all of my hoes have an important improvement in the little double point. All these hoes penetrate the soil as easily as single pointed hoes. The advantages of the double points are several; they pick out single weeds, saving bending the back and using the fingers. I call them my finger hoes, for the work they do in this respect is better and more quickly done than with any other form of hoe. They do not glance off and turn aside as single points do, but cut the root or resisting object, and penetrate the soil with a steady motion. I keep them sharp with a file. Nos. 1 and 2 I use for stirring the soil and for the general purposes of a weed hoe, and Nos. 3 and 4 for more delicate work among close rows of plants. While at work with these hoes I can perform the labor so much more rapidly and with so much less expenditure of force, that if I were again a boy, I could not feel that old dull tired feeling that every boy experiences when set to hoeing "pusly" in the garden. There is an intellectual interest in the work in connection with such tools. Nos. 2 and 4 were made out of common hoes.—D. S. Marvin.



Improvement of Roads.—This question of roads requires the attention of our ablest men, as it is one of greater importance to the farmer than any question now before the public. Transportation is often a question of profit and loss to the producer, for time is money in bringing most crops to market, and the more quickly and conveniently they can be carried, the greater will be the returns.

The principle causes of our bad roads are water and narrow tires under heavy loads. And what are the remedies? To remove the former good stone roads should be built. The money could be obtained by bonding the county, and by collecting toll. Competent persons should be put in charge of the construction, to see that the work is thoroughly done, and that the farmers get what they are paying for.

The roads should be built by first removing the roadbed to a depth sufficient to receive a good quantity of stone. Large stones should be placed at the bottom, and their size should decrease as the top of the bed is approached. When the bed has been filled, the surface should be thoroughly rolled until it is sufficiently compact to shed all water that may fall on it.

A double toll should be charged for every loaded wagon that has a narrow tire. You cannot compel a man to use a wide tire, but if he is so narrow-minded as to use a narrow one, a double tax will widen his views and perhaps his tires. No man complains about paying toll, provided he is using a good road, and those who wear out the road and get the most benefit from it, should also pay for it.—H., *Long Island.*

The Red-flowering Dogwood.—Among our collection of new and rare ornamental trees and shrubs, none have given us more pleasure and satisfaction than the beautiful red-flowered dogwood. It has bloomed before for us, but as the plants were small it did not show to perfection. But this year it has a good opportunity to display its charms, and it seemed to surpass itself. Imagine a large, well developed bloom of the white-flowered dogwood, three to four inches across, but instead of being white, you see it the most beautiful pink We had three and four year old plants this year, but five feet high, with over seventy good sized, well developed blooms on each plant. The foliage is also quite different from the white-flowered dogwood, as it is much darker in color, and has somewhat of a velvety appearance. One can readily select a red-flowered one from among a number of the parent plants, simply by the difference in the foliage.

Like all dogwoods, it is easily transplanted, as it makes plenty of fibrous roots, even when a good sized tree. It is destined to be one of the most popular ornamental flowering trees within a very few years.

Work of the Season.—Now has begun the season when the plants are potted, ready for their winter quarters. Everything that is to be kept in a growing condition should be properly prepared early in September. Then there are the tender summer bulbs, such as gloxinias, tydeas, achimenes, and others—all these should be left in the pot of earth in which they have bloomed, and when winter has fully set in and they have dried nicely, they may be safely kept in a warm closet. If no closet is convenient, prepare a box by papering the inside and covering the outside with cretonne, making a cushion on the lid. This may be placed in the sitting room and closely packed with pots, one placed on top of the other. They will keep well until time to bring them forth in spring. Examine them once in a while to see that they have not become too dry. Be careful not to let frost catch the tuberoses. I like to dig these on a dry day, and after removing the tops, I allow them to dry thoroughly, then pack them in paper bags and keep them in this handy box. I always keep tigridias in this same way. We may leave the gladiolus in the ground as late as the last of October, if pleasant, especially if we have planted them late for display at fairs. Time must be given them for ripening well, or they will not keep. I have dug them after the ground was frozen a little, and have placed them on wire sieves to dry, carrying them indoors at night. These sieves, or trays with a wire screen in the bottom, were the remains of a corn-drying establishment which had its day in this vicinity, and in the course of time the sieves fell to me, and I find them the most convenient thing for drying gladiolus I have ever yet seen. I just put the label in, and then dig the row of that name, place them on the sieve and have no more trouble until they are ready to be put in bags, labeled and hung overhead in a dry frost proof cellar. I have tried every place, I guess, for keeping gladiolus, and have never found a better place than a dry cellar. If kept in a room where there is fire, they will dry out and be utterly worthless. This self-same cellar is filled to overflowing in winter with all sorts of tender shrubs. Tea roses and vines clamber over the wall; chrysanthemums bloom until Christmas. The windows admit plenty of light. Box after box of fuschias and geraniums are carefully packed away on the shelves, and come out in fine condition in the spring. The geraniums are dug and packed in boxes of earth the first week in September, and allowed to stand out doors until cold weather sets in. Don't allow them to be too wet when set away, and be just as careful not to let them become dust-dry during the winter. You will find this a better plan for keeping geraniums than hanging the poor things up by the feet. Early in spring they may be brought up and started into growth in a cool room. Do not water much until growth has commenced.—M. R. W.

Cosmos.—Any word of praise spoken for the lovely cosmos is fully merited, and its late period of bloom only adds to its value in my estimation. Late in the spring I get my stock of cuttings rooted, and as early as possible plant them out in ordinarv soil, having found that rich soil causes a too rank growth. During the summer close attention is given to keeping the plants closely cut back to induce a compact growth, otherwise it forms a long-legged and ungainly plant. Each time that five or six inches of growth is made, it is cut back to the first joint above the previous cut, two shoots being nearly always thrown out from each joint on plants so treated. Along in September the plants are lifted and put in good-sized pots. With a little care, they scarcely wilt, and a month or so later they begin to bloom, lasting for a long time. I have had many plants two feet high and nearly the same in diameter, covered with the pink or white blossoms, and this at a time when bloom was very scarce.—E. E. SUMMEY, *New York*.

Neighborhood Civilities.—I had a nicotiana that would not bloom, spite of all the coaxing and manure I lavished upon it. My neighbor had a solanum that, after two years anxious watching, never showed a bud, "Let's change," said I. "Agreed," said she. So my nicotiana was soon on her piazza and her solanum was on my back porch. And the change agreed with the plants, for in a few days the nicotiana was full of buds, and my solanum was soon covered with small white blossoms, preparatory to turning into bright red cherries. Neighbors will not quarrel that have gardens and exchange their seeds and cuttings over the back fence. Uncle Sam is a good friend to plant lovers in all his broad domain. I have a small wooden box that has gone in the mails from Maine to Kentucky. I wrap the slips in damp moss, pack tightly in the box, and exchange, the box coming back and bringing perhaps exactly the cutting I wanted, and often with a pleasant and profitable letter from a sister plant-lover far away. —SISTER GRACIOUS.

A Mild Winter the last one certainly was, as we are reminded by the fact of having carnations ready to bloom in the garden early in spring, having been left out, entirely unprotected, last fall for want of space during the winter. They were uninjnred and gave a large crop of bloom. Chrysanthemums also came up from the roots of old plants left outside all winter. During more than ten years of gardening experience, I never before have known these plants to survive in this section and amount to anything the following spring. I have nothing to complain of; it is a pleasant surprise.—E. E. SUMMEY, *N. Y.*

FOREIGN NOTES.

'Le Journal des Orchidées" strongly advocates the use of wood in preference to iron, in the construction of houses for orchids.

⁂

Importations of Potatoes in England during July, amounted in the aggregate to 368,049 cwt., as compared with 551,090 cwt. in the corresponding month of last year.—*The Gardeners' Magazine.*

⁂

To Preserve Wood from Decay.—The following method is cheap and effective in preventing the decay of wood when buried in the ground: Mix finely powdered coal with linseed oil and apply to the parts to be buried. —*Revue Horticole.*

⁂

The August number of the *Revue de l'Horticulture Belge* contains a long and interesting article on the new hybrids of streptocarpus. These hybrids are so superior, brilliant, and unexpected, that a universal and lasting popularity is predicted for them.

⁂

Destruction of the Aphis on the Rose —Apply dry and finely sifted wood-ashes to the affected bushes. These should be sprayed before the application, in order to make the ashes adhere to the leaves and stems. This method is cheap and effective.—*Revue Horticole.*

⁂

Proposed Hall of Horticulture.—Efforts are being made to raise £40,000 for the erection of a Hall of Horticulture in London. This building will form the center of all horticultural interests in the United Kingdom, for no such building now exists, although the need of one is greatly felt.—*Journal of Horticulture.*.

⁂

A New Hybrid Narcissus.—This flower is a seedling from Emperor, fertilized by pollen of *N. triandrus.* The flower is three inches across the perianth, the crown is one inch in length. It is of fine waxy substance, and of one uniform color throughout—a creamy ivory-buff. The plant is quite hardy.—*The Garden.*

⁂

New way of propagating Hydrangea paniculata. —This consists of using the flower buds as cuttings. The buds root readily, provided they are taken off with a heel. If grown in small pots and forced, these small plants can be made very effective for decorative purposes, as they flower almost immediately.—*Bulletin d'Arboriculture.*

⁂

Early Germination of the Seed of Rosa laxa.—Of the seeds gathered during the fall of 1889 at the Froebel School of Forestry, in Zurich, fully two-thirds have been successfully started. They were not prepared in any way before planting, but were gathered early, cleaned, and immediately sown in the open ground.—*Rosen Zeitung.*

Mme. Barthelemy Levet is a little known but valuable variety of the Dijon teas. It is a free and beautiful rose, powerfully scented, an abundant bloomer, and very vigorous. The flowers are of medium size, globular, and of a pale canary color. It promises to be very satisfactory upon the wall, and I have seen it doing well upon a fence.—A. H., in *The Garden.*

⁂

Fruit in Spain.—When a Spaniard eats a peach or pear by the roadside, wherever he is, he digs a hole in the ground with his foot and covers the seed. Consequently, all over Spain by the roadside and elsewhere, fruit in great abundance tempts the taste, and may be picked and eaten by anybody. This fruit is a great boon to tired and thirsty travelers.—*The Garden.*

⁂

Our reports tell of fruit everywhere, but the tale is that while there is not plenty, comparatively few of the many kinds of fruit cultivated this year are giving more than half or a third of an average crop. Apples lead the way as the best fruit crop of the year, and are considerably below a fair average. Plums are at the bottom of the scale, and may be pronounced a complete failure.—*The Gardeners' Magazine.*

⁂

Two Early Chrysanthemums.—In the gardens of Messrs. Ried & Bornemann, of Sydenham, London, two chrysanthemums have bloomed remarkably early during the past spring. The varieties are Grace Attick and Golden Shah. The former bloomed even in April, although the usual time for these flowers is two or three months later. Both varieties are beautiful and in every respect worthy of cultivation.—*Gartenflora.*

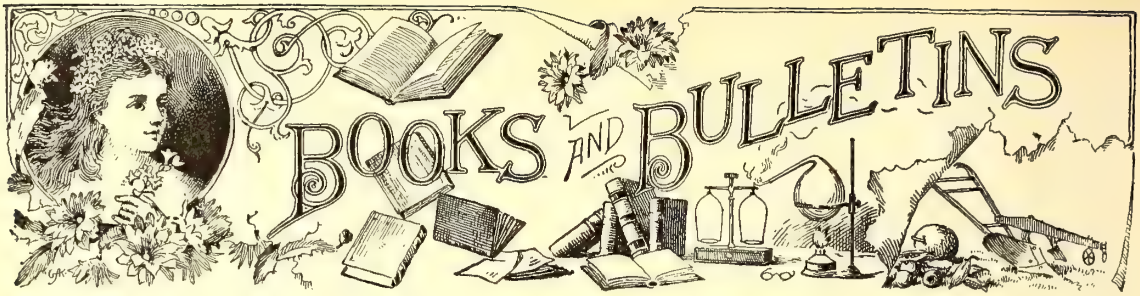
⁂

Obituary.—B. S. Williams, well-known to orchid growers, died in June, at the age of sixty years. Among his works are the Orchid Growers' Manual and the Orchid Album.

M. Houllett, for a long time superintendent of the greenhouses in the Botanical Gardens of Paris, died in his seventy-fifth year. The genus of orchids, Houlletia, was named in his honor.

⁂

The Cabbage Butterfly.—About the middle of July, before any cabbage butterflies were seen, a barrel was procured and packed three-fourths full with old linen and woolen rags. The rags were firmly fastened to prevent their falling, and then the barrel was inverted and placed over a kettle of burning sulphur. It was left in this position about twelve hours, and then the rags were distributed among the cabbage, from thirty to forty feet apart. In four weeks the operation was repeated, and in October the cabbage stood uninjured, for not a butterfly had been near the field during the summer. The same experiment carried on in a neighboring village was equally successful.—*Landw. Ztg. f. d. Prov. Sachsen, etc.*



BOOKS AND BULLETINS

Fruit Cook Book.

FRUITS AND HOW TO USE THEM.—*A Practical Manual for Housekeepers, containing nearly seven hundred recipes for wholesome preparations of foreign and domestic fruits. By Mrs. Hester M. Poole. New York: Fowler & Wells. 12mo. Pp. 242.* "To women the increased culture of fruit is a peculiar blessing. Unless the housewife be hopelessly wedded to the old custom of providing heavy meats, rich puddings and dyspepsic pastry, there is no reason why she may not, by the use of fruits, furnish a large and practically endless variety of dishes, one day after another, all through the year."

It is little less than a wonder to the uninitiated to know that so many tempting dishes can be made from common fruits. Mrs. Poole treats her subject thoroughly, yet concisely, and we wish that every cook in the land had her book and had gumption enough to use it. The nation would improve in condition. The book not only treats of the common fruits of the north, but discusses many sub-tropical fruits as well. Full directions are given for the preparation of jellies, preserves, pickles, ices, etc. It is the best book of its kind.

Spinach Diseases.

BULLETIN NO. 70, NEW JERSEY EXPERIMENT STATION. *Some Fungous Diseases of the Spinach. By Byron D. Halsted. Pp. 15. Illustrated.* Dr. Halsted is the first of our botanists to make a study of spinach diseases. He finds four specific diseases in New Jersey on the forced crop. The mildew (*Peronospora effusa*), to the naked eye produces gray, slightly violet patches of a velvety texture upon the under side of the leaves, while from the upper side they have a pale yellow shade, due to the loss of the green color. The anthracnose, a new species (*Calletotrichum spinaceæ*), is perhaps the worst disease. It "is a fungus of rapid growth, and therefore quickly spreads from one plant to another. It produces patches or blotches upon the leaves, at first small and inconspicuous. The first indication of its presence is an indescribable moist appearance of the usually circular affected part, followed by the appearance of minute brown pustules, while at the same time a gray color develops, and the diseased area becomes dry. No particular part of the leaf is first attacked, and therefore no two leaves appear alike. In some cases the largest leaves will be diseased, in other plants only the younger ones; but sooner or later, plants that are affected will become entirely unfit for use." The leaf-blight (*Phyllosticta Chenopodii*) "forms minute pimples in considerable numbers upon the part of the leaf attacked, usually the lower half." The white smut, a new species, and dedicated by Dr. Halsted to J. B. Ellis (*Entyloma Ellisii*), gives "the infested leaf a light appearance, as if covered with a fine frost. The attacked leaves were uniformly without the normal green color, and of course, worthless for market." Some black molds also attack the spinach, but they are not often serious pests.

The treatment for these new pests cannot yet be given definitely. The subject is recent, and there are also peculiar difficulties in the way, for "spinach is a crop upon which remedies cannot be so readily applied as many others, because the parts attacked are the ones grown for market.

"The spinach grower must turn his attention to the soil, and seek to have it in the most healthful condition for the growth of clean plants. It is not known how long the spores of the fungi enumerated can retain their vitality. Whether for a long or a short time, it is a reasonable precaution to destroy all refuse leaves that accumulate in the beds and the assorting-house. It is a small matter to keep these leaves, loaded with thousands and millions of spores, from getting mixed with and forming a part of the soil of the hot-bed, or of the soil that may afterwards be used in growing the spinach. It is not simply a matter of neatness, but of preventing or checking the decay. The worst thing to do would be to throw the diseased leaves and refuse of the spinach bed upon the manure heap that afterwards is to furnish the material for the hot-bed. If possible, change the location of the beds. Where the grounds cover several acres, it is possible to go some distance away from the old infested beds and start upon fresh ground. It has been demonstrated with many fungi, as the smut of corn, onions, etc., that the trouble increases with the length of time the same soil is covered with the same crop. In other words, the soil becomes impregnated with the spores, and the wisest plan to pursue is the abandonment of that crop and grow others not susceptible to the same fungi for a few years, until the spores in the soil die from lack of conditions for growth and propagation. To these precautions it is possible to add the treatment of the soil devoted to spinach with certain chemicals that, while doing no harm to the crop, tends to rid the soil of the disease germs that may be present. It is a matter of experimentation to determine what will prove most affective for this. Equal parts of air-slaked lime and flowers of sulphur thoroughly raked into the bed might be in a large measure preventive."

It is also possible that spraying the plants while young with hyposulphite of sodium, sulphate of potassium or sulphate of copper may be found to be useful and practicable.

Pear and Cherry Slug in Nevada.

BULLETIN NO. 10, NEVADA EXPERIMENT STATION. *The Pear and Cherry Slug. By F. H. Hillman. Pp. 4. Illustrated.* Mr. Hillman finds that the cherry slug (*Selandria cerasi*) is coming to be very destructive in Western Nevada. He recommends a spray of London purple or Paris green if the fruit is not near maturity. Dusting the trees with any dry powder, as lime or road dust, is useful, although the slugs have a provoking habit of shedding their skins and leaving the dust on their old garments. But tobacco, hellebore and buhach (pyrethrum) were found to be good remedies. "A double handful of refuse tobacco was boiled, and the decoction diluted to form eight or ten gallons. A tablespoonful of white hellebore to five gallons of water, and the same amount of buhach in the same amount of water, were separately sprayed upon different trees, resulting in each case in the death of nearly all the slugs. A second application took them all. These being vegetable compounds, no injury to the foliage is at all likely to result, which is not always true in the use of inorganic compounds."

Potatoes in Georgia.

BULLETIN NO. 8, GEORGIA EXPERIMENT STATION. *Irish Potato Culture. By Gustave Speth. Pp. 8.* Tests are recorded of a number of varieties of potatoes. An experiment with fertilizers gave the following results: "(1) Potash, in both forms [muriate and kainit], gave the smallest increase. (2) Stable manure and complete fertilizers indicate the best results; larger quantities of potash in either form, combined with a complete fertilizer, did not increase the yield, but seemed rather injurious in the case of kainit. The same result is recorded when the potash salts have been used alone. (3) The percentage of increase where acid phosphate alone was used is quite marked, but together with potash or cotton seed meal, no gain is indicated. (4) Cotton seed meal alone shows a gain of about 50 per cent. (5) Where stable manure was applied the number of scabby potatoes was the largest, as well, also, as the yield of marketable potatoes. (6) The results seem to warrant the conclusion that a fertilizer containing all the food elements in the same proportion and in available form, as a good stable manure, give the largest increase, and that incomplete fertilizers, while they show a gain over the unfertilized plots, are not remunerative."

Potatoes from different latitudes were planted. Those from Ohio vegetated first and southern seed last, but in yield "the results of the experiment direct decidedly in favor of southern grown seed, and as with somewhat favorable condition a paying second crop can be produced, very often larger than in spring, we can not strongly enough urge our farmers to raise their own seed." "To determine the difference of production, if any, of seeds cut within different times of planting, medium sized tubers of the Early Rose variety were selected and cut to three eyes, ten and five days before, and on the day of planting. * * * The results were slightly in favor of cutting the day of planting; but the season was dry, while in a wet season the result might have been reversed, on account of the dried pieces being better able to resist the tendency to rot before sprouting. Further trials will be necessary before we can draw any positive conclusions."

Greenhouse Construction.

BULLETIN NO. 63, MICHIGAN EXPERIMENT STATION. *Greenhouse Building and Heating. By L. R. Taft. Pp. 27. Illustrated.* Professor Taft has made some interesting trials in making and heating forcing-houses. This bulletin describes the method of construction of two forcing-houses recently erected, and which may serve as models for commercial growers. Several methods of ventilating and glazing were employed, and opinions are now expressed as to the relative merits of each. It is probable that different estimates will need to be placed upon some of the methods of glazing after they have endured the trials of ten or a dozen years. The bulletin should be studied by everyone who contemplates building a glass house. The most important features of construction are summarized by Professor Taft as follows: "In the construction of forcing-houses for commercial purposes, we believe that the best results will be secured if the walls are built of grout (cement, sand and cobble-stones) below the surface of the outside soil, with a portion above the grading of wood, with from two to four thicknesses of boards, two of building paper and an air space. If properly built, however, a wall entirely of grout will prove almost indestructible. We should build the roof of permanent sash bars, and use glass at least twelve inches wide. The butting of the glass has given us entire satisfaction. * * Gasser's glazing strip will make a tight roof."

Steam and Hot Water.

The most important part of this bulletin is the discussion of the relative merits of steam and hot water heating. The two houses, exactly alike, were used for a test extending through the winter. Both were heated with Furman boilers, one being piped for hot water (with wrought iron pipes), and the other for steam. Very complete records were kept of the outside and inside temperatures, and of the amount of coal consumed. This is one of the most important tests yet made at the stations, and should command universal attention. It was found that less coal was used in the hot water plant, and that a higher temperature was maintained and the range of fluctuation was less. The following tabulation will indicate the extent of saving in coal, and the average temperatures secured.

MONTH.	TEMPERATURE. (Average at 6 A. M). *Water.*	*Steam.*	FUEL. (Average per day). *Water.*	*Steam.*
December	54.9°	52.4°	75 lbs.	93.2 lbs.
January	54.1	52.5	90.32 "	112.09 "
February	55.57	53.82	99.1 "	121.04 "
March	54.9	53.38	113.70 "	131.45 "
Average	54.87	53 02	94.53 "	114.53 "

"This shows for nearly four months an average of 1.85° in favor of hot water, and a coal consumption in the steam heater of 21.5 per cent. greater." Of course these tests do not demonstrate that hot water is preferable to steam in all cases, yet they are strong indications of it. We understand that Professor Taft expects to make a similar test the coming winter with other heaters; this should be made upon some large area of glass

Strawberries in Maryland.

Bulletin No. 9, Maryland Experiment Station. *Strawberries. By W. H. Bishop. Pp. 31.* This bulletin gives, in tabular form, the results of observations as to sex, origin, date of introduction, time of blooming, maturity and weights of 20 berries of many varieties of strawberries. Descriptive notes are also added of some sorts. No succinct conclusions are drawn. Tests were made upon the relative merits of matted row and hill culture. "Comparing the results of the two methods of culture, it is found that in nearly all varieties the matted rows gave the larger yield and generally larger fruits. It has often been said in the past that cutting off runners, and so confining each plant to a single stool, resulted in giving larger berries, although fewer in number. Careful weighings of a given number of berries from nearly every picking of each variety this season give the advantage in size of fruit in nearly every case to the matted rows, and the (generally) marked increase in yield from this system leads us to believe that the matted row plan is greatly superior to the other, except with a very limited number of varieties. It is probably true that for success with the hill system, very rich soil and high culture are necessary; even then it is doubtful if anything is to be gained by it."

Strawberries in Virginia.

Bulletin No. 7, Virginia Experiment Station. *Variety Tests with Strawberries. Wm. B. Alwood. Pp. 16. Illustrated.* The strawberry is coming to be an important fruit in Virginia. It was found last season that mulching the vines is decidedly beneficial, even in Virginia, where such protection has been supposed to be unnecessary. Tables are inserted giving the salient points of many varieties, and descriptive notes are made of the leading sorts. Of the new kinds, Bubach No. 5, Crawford, Eureka, Haverland, Miami and Parry are considered the most promising for commercial purposes. A selection of any three or four varieties of the following list are "recommended for home growers": Belmont, Bomba, Bubach No. 5, Crawford, First Season, Haverland, Jessie, Parry and Sharpless.

Fungi and Insects.

Plant Diseases, Injurious Insects and Remedies. Several investigators have recently issued reports upon comparatively well known diseases and insects, with the most approved remedies for them. These reports are invaluable to anyone who grows a plant, and are as follows: Treatment of Plant diseases, extracted from *Journal of Mycology;* B. T. Galloway, Department of Agriculture (grape diseases, pear scab and leaf-blight, powdery mildew of apple, peach yellows, mildews under glass, cranberry fungi, apple scab, copper salts as fungicides, smut in cereals). Rusts, Smuts, Ergots and Rots, New Jersey Board of Agriculture, and also separately printed; B. D. Halsted, New Brunswick, N. J. Fungicides, Bulletin No. 102, Connecticut Experiment Station; Roland Thaxter. The Treatment of Certain Fungous Diseases of Plants, Bulletin C, Tennessee Experiment Station; F. Lamson Scribner. Insecticides, Bulletin No. 58, Michigan Experiment Station; A. I. Cook. Insecticides, Bulletin No. 15, Alabama Experiment Station; George F. Atkinson. Entomological Notes, Bulletin No. 9, Florida Experiment Station; J. C. Neal.

L. H. B.

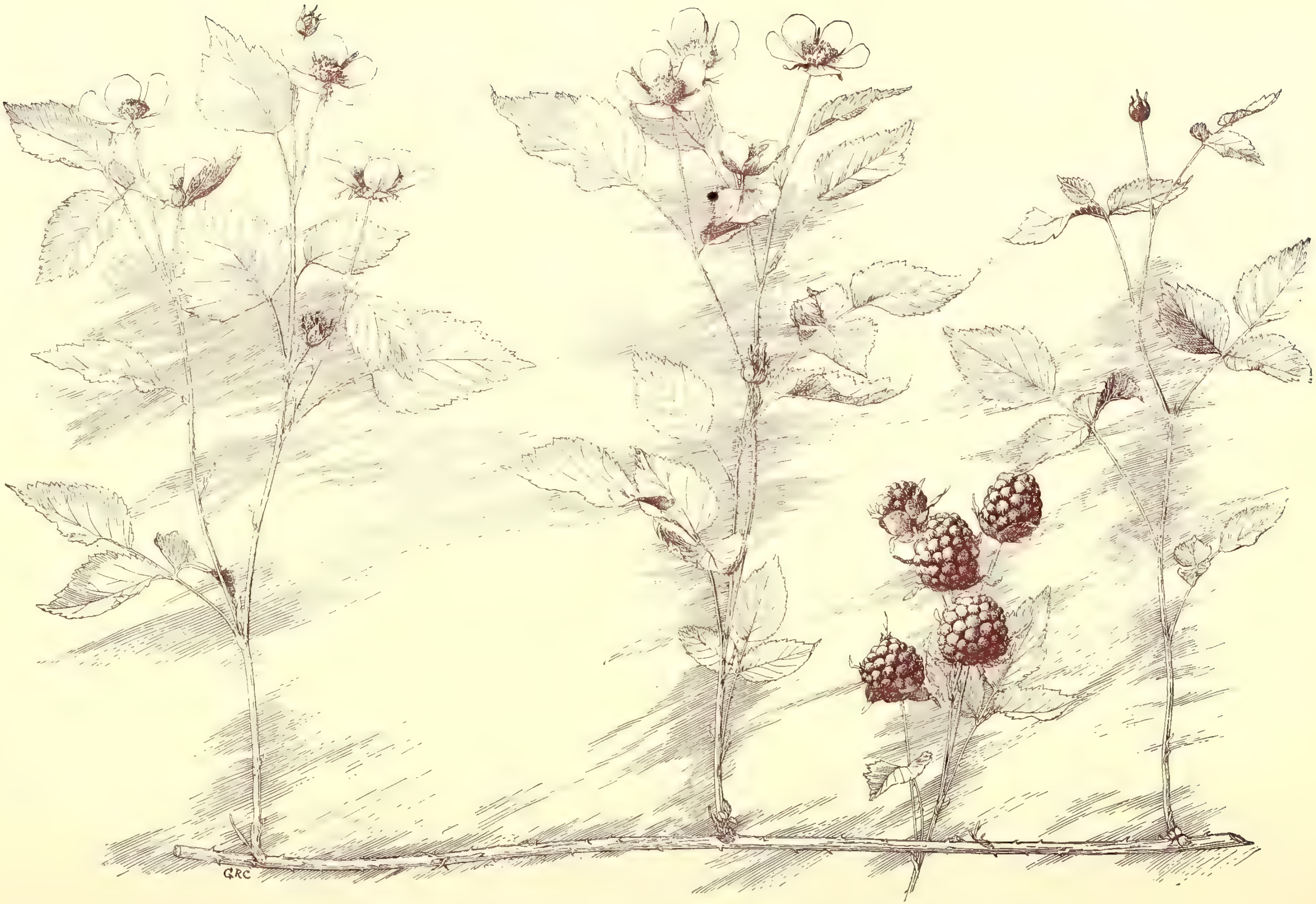
Where the Opopanax (*Acacia Farnesiana*) **Grows.**—The following extracts have been taken from letters which have been received in answer to the questions regarding *Acacia Farnesiana*, asked by "K." in the January American Garden (page 58):

From C. H. Dorset, Savannah, Ga.: "I want to say that Savannah is the home of the opopanax. In our garden here there are large trees covered with it."

From W. B. Conard, Sharon Hill, Pa.: "The opopanax mentioned in The American Garden is described under the head of acacia, both in *Johnson's Gardeners' Dictionary* and Nicholson's *Dictionary of Gardening*. Generic and specific names are given. Nicholson says that it is a native of 'St. Domingo (1656).' I saw it growing, trained on the wall of a building near Santa Barbara, California, during the winter of 1888–89, and should think it would grow anywhere out of doors in southern California. The seeds are like others of the family, but larger, and if planted while fresh germinate readily."

From S. W. Horsey, Charleston, S. C.: "I have no trouble in raising the young trees. I have now about 100, started this season. To insure success, the seeds should be thoroughly soaked, planted in wet earth and kept damp until the young plants are two feet high. It is altogether a mistake that it will not grow in South Carolina outside of Charleston, Beaufort, and Waterboro. During the flowering season of this charming shrub, from $5 to $8 per day can be made filling northern orders. The plant will stand a fair amount of cold, but frost is emphatically fatal to the stamens."

From Mrs. Heldenfels, Beeville, Texas.: "Unless I am very much mistaken, the *Acacia Farnesiana*, or opopanax, grows here. It is usually in the form of a shrub, but by trimming to one stem, it can be trained into beautiful small trees, say 15–20 feet high. In the last mild winter the foliage was not shed. The young growth is killed back some distance by heavy frosts. This plant grows in great profusion here. Further west it is used for shade trees, and nobody notices it because of its commonness."



LUCRETIA DEWBERRY—*Rubus Canadensis*, var. *roribaccus*, n. var.—$\frac{2}{5}$ NATURAL SIZE. (See page 641.)

The American Garden.

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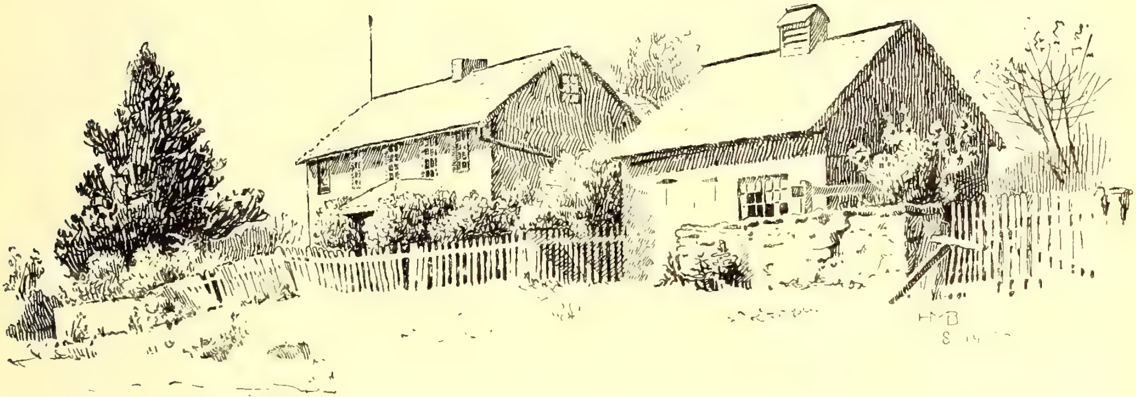

Backwood Gardens

PRIMITIVE TANGLES UNDER THE SHADOWS OF GREAT CITIES—GARDENING OF LOVE.

IN AN eastern state, not twenty-five miles from one of the largest cities in the Union, I have come across sections as remote in reality from the centers of thought and the business world as though they were in the heart of a Montana forest. Usually in tracts of land cut off from railroads, the farms, mostly small ones, nestle cosily among the woods and hills very much as they must have done two hundred years ago, for the land here was among the very first in the country to be agriculturally claimed and used. The citizens, in times far back, were politicians and men of affairs, and indulged themselves in debating societies, clubs, secret lodges and so on, aiming to be liberal minded ; but the onward march of the world outside has had an opposite effect on them, and their ambitions intellectually have withered away, with a few isolated exceptions. Even the Saturday night lounge at the corner-store for the exchange of ideas is left to the boys. The men seem to be as distinct and different a type from the western backwoodsman as can be imagined. Thoroughly discouraged and narrow-lived, they have the air of being behind in the race, and instead of striving for the betterment of things, take a delight in making existence as hard as possible for themselves. Early to work, and with the day's works's end to bed, is very often the day's sole program ; no magazines, no time for flowers, no anything, I regret to say, that would tend to brighten the home life.

And as for the boys—a small percentage of whom will presumably step into their father's shoes—they will be their fathers over again. I have not found one this summer who would own to a liking for flowers, for instance. Perhaps boys, in this, are alike the world over, but yet it strikes one as strange that those born and living with such a beautiful country surrounding them, woods and flowers nowhere in the country excelled, should have every thought centered in things the very opposite. They live with

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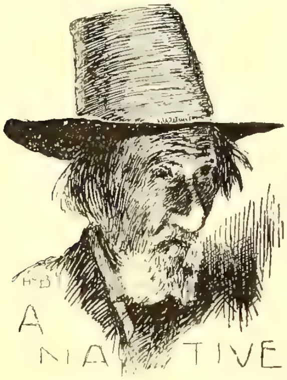
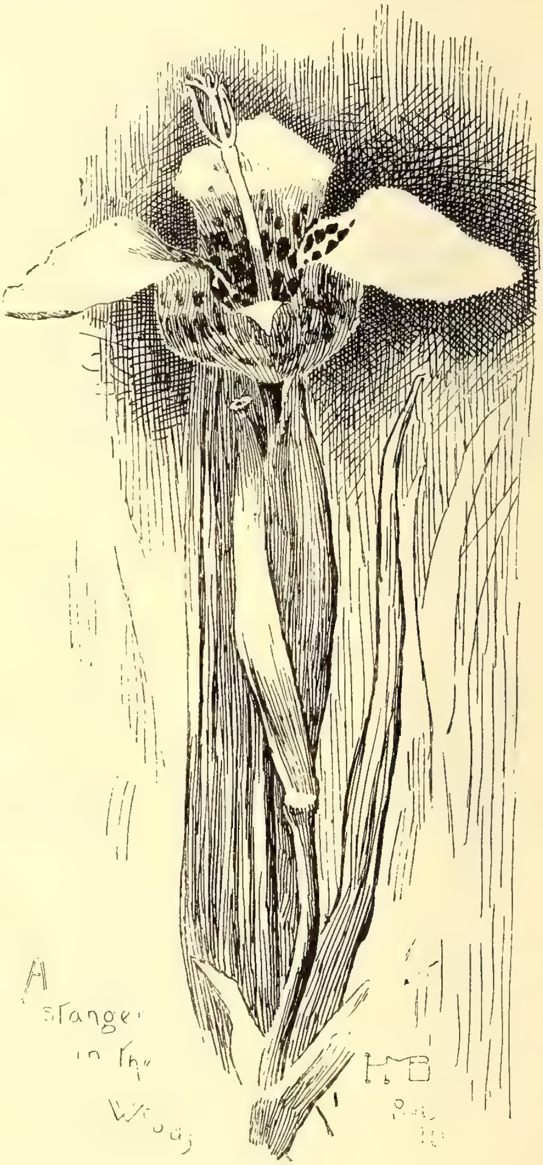
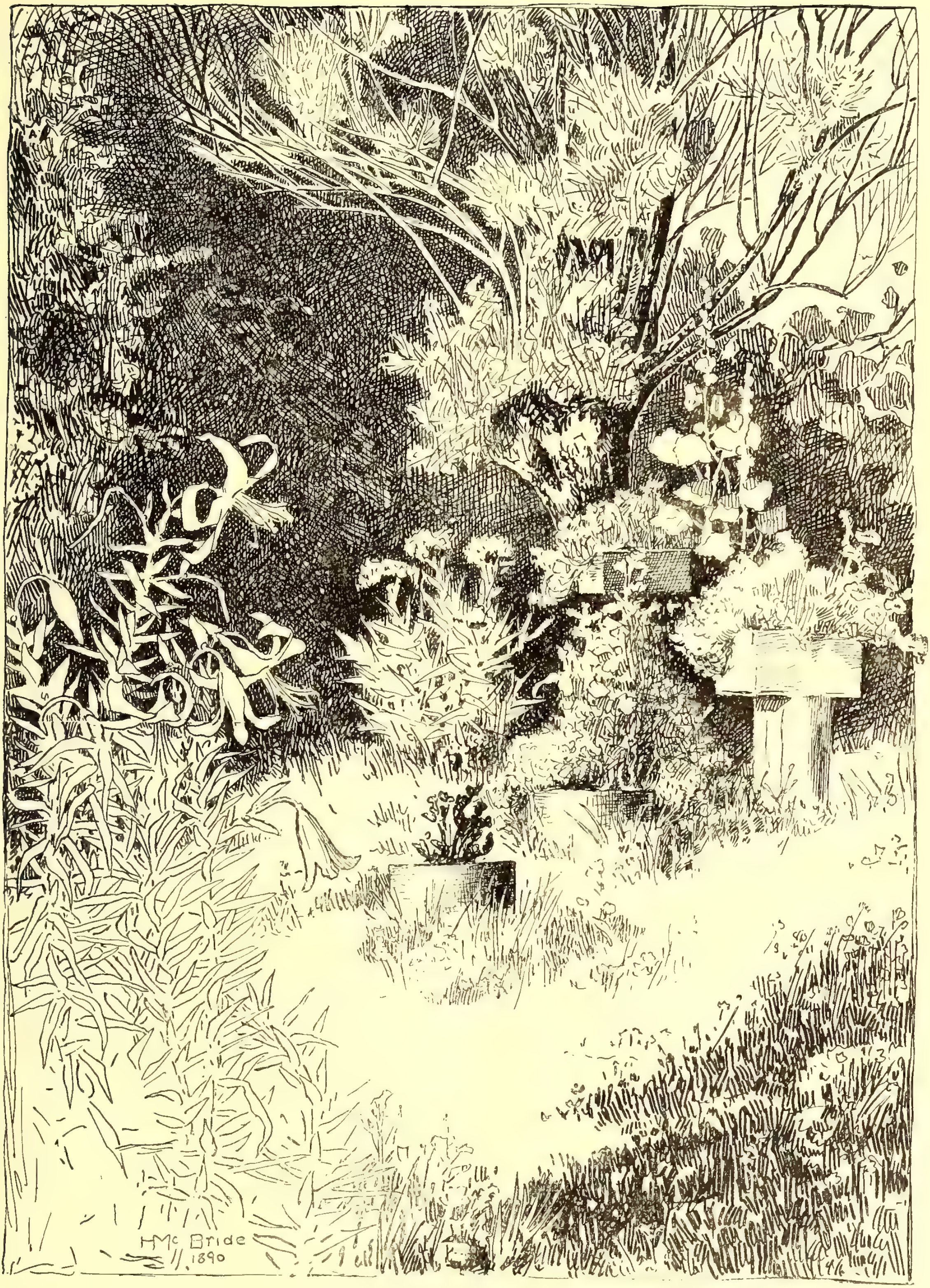
no other thought than the city. A city cousin is their delight, and the bits of slang they manage to pick up are conned over and mouthed as delicious morsels. It is only natural then, I suppose, that they should effect an extreme contempt for things green and vernal, and at their first opportunity follow their cousins to town. The country's hope is in its boys, of course, and *this* country's hope is very faint—population and land-values decreasing together and farming generally going down. There are, for a fact, seventy less inhabitants in this township now than there were in 1820, and the same story is heard very often elsewhere. The explanation everywhere given is that "the larger farms west swallow up the little ones east." So much for the cause of the Eastern Backwoodism.



Flowers and gardens consequently would have a poor chance were it not for the women folk, and even they, in their floral surroundings, are forced to be unambitious—public sentiment being so thoroughly against them. The weakness for flowers, when it exists, is amiably tolerated, but the universal feeling seems to be that not too much time must be wasted and no money expended.

I know two or three gardens, quite extensive and flourishing, that as far as plan goes are a mere growth of the years, aided by expert bargaining from time to time, and have cost not one cent of money. It is on record that once a reckless woman subscribed to a farmer's journal that netted her as a premium a Storm King fuschia, but the poor Storm King sickened and died and made such a melancholy example of itself, that the experiment has never been repeated. * * * The neighbors, when they indulge in a call, poke around among the flowers while they talk, as a general thing, and when they discover a plant new or rare to the locality, hasten to take a "slip." It is a very formal call indeed that doesn't produce for the visitor a half-dozen acquisitions, and the hostess, unconsciously business-like, makes a note of it, and when the call is returned takes every care to make the exchange even. This system of exchange is the secret of the growth of the gardens of the backwoods, and one result is that the same flowers re-appear at every farmhouse. Youth-and-old-age (zinnias), lady-slippers, marigolds, queen marguerites (asters), day lilies (at least three distinct lilies are so called here) are abundant, and perhaps the most characteristic. Every yard has them more or less in profusion. The zinnia is a plant wonderfully well able to take care of itself, and seems to take a special delight in blooming and brightening the homes of the very poor. They and marigolds may be plebeian, but I do not think I ever saw a more brilliant display than the beds of these flowers that adorned the front of an old darky wood-chopper's hut. He had but a small space between


A Stranger in the Woods
H.B

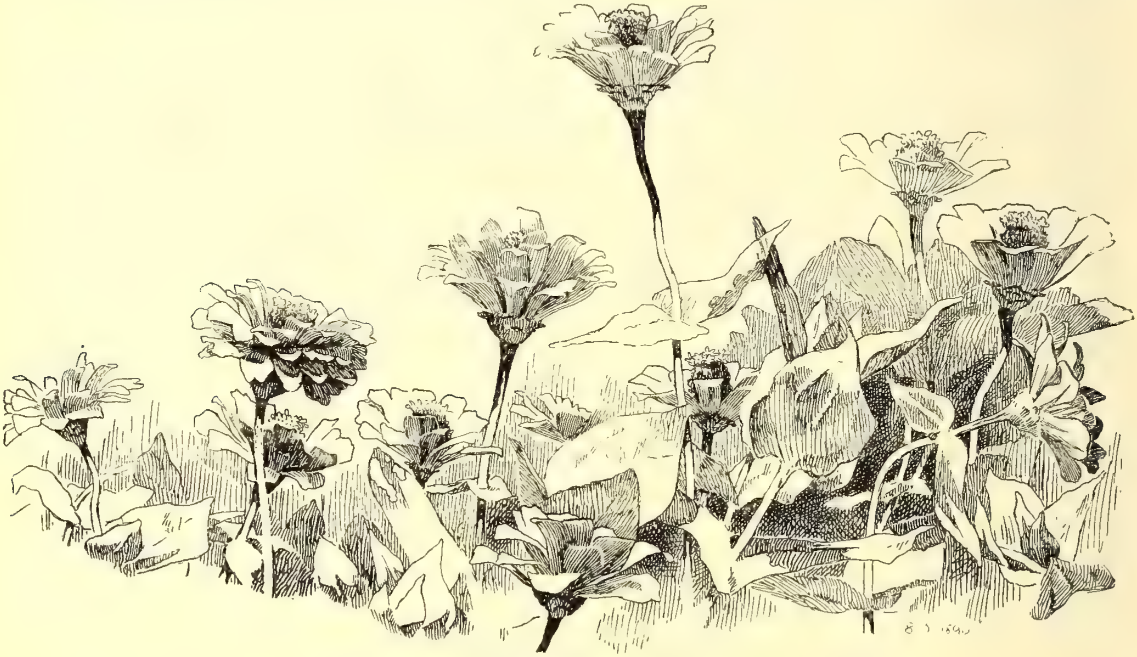

HMc Bride
1890

"A Mere Growth of the Years, Aided by Expert Bargaining from Time to Time."

his doorstep and the road, but it was a mass of color, reds and yellows. One could not help thinking that there were plenty less satisfying homes than that poor old cot.

The garden I know most intimately is surrounded as usual by a white-washed pale fence, and is filled to overflowing with maple, spruce, tamarisk, fruit trees and a mass of all kinds of shrubbery and flowers. It is full—of course, too full—and indeed I do not think there is a single law of landscape gardening that has not been violated in the arrangement of it, yet the place to me is full of charm; and, personally, I would not have it altered. People from the city who occasionally catch glimpses of it, frown on it, as a matter of course, and suggest that the boxwood be removed, and the maples be trimmed, and the cherry trees cut down, but nothing is ever done, and I hope nothing ever will be. With all deference to THE AMERICAN GARDEN, I would even let the fence remain as it is. It has its uses. As a trellis for dahlias and roses it could not be excelled, and no one can call it unsightly. Around the house and the edge of the yard the flowers are planted—wherever it came handy—and though precious little care is bestowed upon them, they thrive and bloom famously; geraniums, sweet alyssum, nasturtiums, dahlias—all a delicious tangle. Over a cedar tree a wild clematis drapes itself, and honeysuckle and wistaria festoon the porch. Under a Norway spruce some *Begonia rex* slyly and shyly bloom. In a corner, screened by althea bushes, white August lilies hold sway. Opposite them, and surrounding the pump, are groups of white phlox, hollyhocks and more dahlias. Every space is utilized. The pump takes the place of the more æsthetic fountain and is the center around which the garden thrives. Everything leads the eye up to the life-giving pump. Perhaps it is not inappropriate.

The before-mentioned boxwood, of all shapes and sizes, lines the walk, and clumps of it are scattered about in a mysterious way as if they might be the remains of a one-time "maze," though it is unlikely that the garden ever boasted of so aristocratic an adjunct. But everything about the place gives a vague suggestion of by-gone times and people, and the ghost of many a poor hard-worked, scanty-pleasured women gardener seems to linger around plants that knew no other care.



YOUTH-AND-OLD-AGE.—THE ZINNIA.

I know another garden in the neighborhood, presided over by a Quakeress, and though its directress uses the "thee" and "thou" in speech and dresses in neat and quiet garb, her taste florally, as evidenced by her plants, leans surprisingly toward the worldly, and her main idea seems to be to eclipse her neighbors and possess what they possess not. The exchange system would be universal but for the Quakeress—she is the one exception. She has a collection which she is strong-minded enough to keep to herself. She knows it is beyond compare, and she wards off traders with contempt. She showed me with pride a thriving specimen of the "Bride" rose (not "The Bride" of recent fame, but something older, a white hybrid perpetual), an immense climbing Baltimore Belle and three curious cacti, among them a night blooming cereus with one cherished bud. With this last came the information that it came from the city. My hostess, noticing how impressed I was, volunteered its further history.

"I stole it," whispered the gentle Quaker, looking fearfully around, though there was not a soul within half a mile. "I went visiting to Cale's folks in town, summer-was-a-year ago, and when we went through the hot-house there, I peaked off a bit of this," pointing to the cereus, "before I knew what I was about, and there it is. Don't do anything to it much, but it does thrive wonderful. I guess I was meant to have it."

This cereus is the special admiration of the neighborhood. All the women gaze on it with something of awe and wonder, but I do not think any of them know as much of its doubtful antecedents as the gentle reader and I do, or I am very much afraid that they would follow the example of its owner and "peak a bit."

Pennsylvania. HENRY McBRIDE.

NOTES FROM A GARDEN HERBARIUM—I.

THE DEWBERRIES. *Fig. 1, Frontispiece.*

THREE species of rubus are popularly called dewberry in the eastern states—*Rubus Canadensis*, *R. hispidus*, and *R. trivialis*. These are also all known as low-blackberry and trailing-blackberry. In the botanies the name dewberry is usually restricted to *Rubus Canadensis*. These three species are much confused in the popular mind, and it is also probable that comparatively few botanists have a clear understanding of them. This confusion is due in part to the great similarities in the species themselves, and probably fully as much to the imperfect characterizations and descriptions in the books. An instance of an error in the books, which is everywhere copied, is found in the case of *Rubus hispidus*. It is said to inhabit swampy places and low woods, and in Gray's Manual it is called "running swamp-blackberry," while it is common upon sand banks! I never saw thriftier specimens of it than I collected this summer upon clean and dry white sand. Neither do the books say that its leaves are glossy above, which is the fact, at least when it grows in the sun, and which affords one of the best distinguishing characters.

Rubus Canadensis is generally distributed throughout the region east of the 100th meridian from Newfoundland to, Virginia, probably. *R. trivialis* represents it in the south, extending from Virginia to Florida, and westward to New Mexico. *R. hispidus* has much the same range as *R. Canadensis*, except that it reaches southward to Georgia.

R. Canadensis and *R. trivialis* are closely allied. Both have pointed or acuminate leaflets, which are singly serrate, or, more properly, dentate, with coarse teeth, stems beset with sharp and curved prickles, and both are comparatively stiff and strong growers. The chief contrasting points of the two species are these: *R. Canadensis*—Main stems rather sparsely and lightly prickly; leaves thin and deciduous, either destitute of prickles or provided with weak ones, and more or less hairy; leaflets ovate and comparatively large; sepals often prolonged and leaf-like and lobed. *R. trivialis*—main stem mostly thickly beset with stout prickles; leaves firm, and nearly or quite evergreen, with usually stout-prickled petiole and midrib, and smooth, or very nearly so; leaflets oval-oblong or almost lanceolate and small; sepals not prolonged nor cut, so far as I have seen.

From these species *Rubus hispidus* is distinguished by its very small and weak long stems, which are beset with hair-like bristles, which only rarely become stout enough to scratch the hand seriously; the obovate and obtuse shining leaflets, the terminal one of which is not stalked; the fifiform pedicels and spreading inflorescence, and the small flowers and fruit. It is in every way a much more delicate plant than either of the others. A sprig of it is shown in Fig. 2.

Now, what is the cultivated dewberry? It is always said to be *Rubus Canadensis*, yet it is by no means certain that it should be referred to that species. The Lucretia dewberry looks like a distinct and new species, yet it had probably better be referred as a variety to *R. Canadensis* until we know our rubuses better. The frontispiece, Fig. 1, is a good illustration of the Lucretia dewberry. The leaves, especially those on the sprig at the left, are seen to be very broad and straight at the base, and to be doubly serrate and jagged. These are characters which do not belong to the type of *Rubus Canadensis*. Fuller characters of separation may be given as follows:

Rubus Canadensis, Linn., var. RORIBACCUS, *new variety* (*ros*, dew; *baccus*, berry). Plant larger and stronger; leaflets broad below, usually triangular-ovate, doubly serrate with small teeth, and more or less notched or jagged; peduncles longer, straighter and stouter, habitually more numerous and more conspicuously overtopping the leaves; flowers very large (sometimes two inches across!); sepals uniformly larger, some of them much prolonged and leaf-like and conspicuously lobed (sometimes becoming an inch long and wide); fruit much larger.

But the cultivated dewberries are not all the same. I have a specimen of a plant which I once grew, sent me as "Lucretia's Sister," which is, apparently, true *Rubus Canadensis*. I have no record of the source from which I obtained this variety. I also have specimens of Bartell and Mammoth, which are clearly distinct from the Lucretia. They have the coarsely dentate leaves of *R. Canadensis*, nearly smooth pedicels and less conspicuous sepals than Lucretia. They are, apparently, robust forms of *R. Canadensis*, but my specimens are insufficient for positive determination.

The Lucretia dewberry is said to be native to the hills of West Virginia, and is said to have been introduced from there by B. F. Albaugh & Sons, of Covington, Ohio. It has been in cultivation for a number of years. Neither the fruit nor any part of the plant has ever been truthfully figured, so far as I know. The trade cuts and lithographs of the dewberry are unlike it.

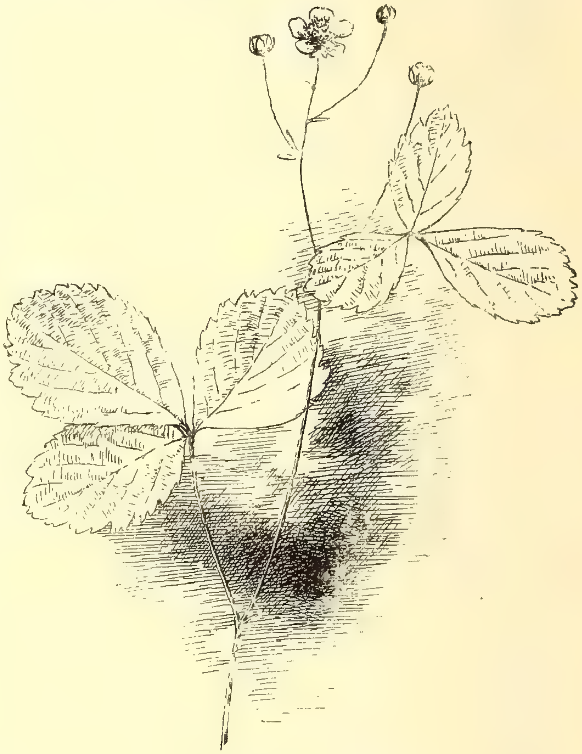


FIG. 2. RUBUS HISPIDUS.

As a fruit, the Lucretia dewberry has given poor results with me. The plants are unproductive and the berries are seldom well-formed. But others have obtained remarkable results from it, and I am confident that it possesses promise. It is not improbable that the variety is not uniform in character, and that it needs more systematic attention in the way of careful selection; but it is evident that I have not yet learned how to grow it.

L. H. B.

A MOUNTAIN TRAMP—II.

IT WAS morning on the mountain. Oh! You who live in town, do you know what morning means? When the night rolls away and reveals the world, have you ever beheld the scene new-set, new-set albeit the same was spread before your eyes yesterday, and for countless yesterdays?

Dimly conscious that day was breaking, I struggled to waken. I was very tired, and sleep would not depart from my eyes. Although I had promised myself the pleasure of watching the dawn, it now needed more than my love of nature to call me forth. This want was soon supplied. About our door was heard the squealing and grunting of swine, accompanied by the yelping of dogs. Sleep was no longer possible, and we went out into the new day. In the street a sorry collection of porkers was gathered, waiting for their morning meal. They were of the native, razor-back variety—gaunt, long-limbed and long-jawed. For each pig there was at least one of the omnipresent yellow dogs, long of body and short of limb. The poverty of a Tennessee mountaineer may often be reckoned in direct proportion to the number of his dogs—the poorer the man the more curs about him.

The town we saw to be literally "founded upon a rock." We saw the out-cropping—the western edge of the upper strata of the coal measures. We trod immediately upon the rough surface of the sandstone conglomerate; such scant soil as there was above it was only the sand worn from the rock by attrition, by the lapse of time, by the processes of nature.

This is the county-town. It is almost as old as the century, and looks as though it might never have changed since first it dropped down there, to live or die as chance might decree. In the center stands the brick court-house, plain, square, homely, weather-stained, dilapidated. Around three sides of the square are small, weather-stained log and frame buildings. Beyond we note some small clearings where the timber has been cut for fuel, and where such soil as there is, is cultivated to produce a little corn and potatoes. Beyond these patches, and always within a stone's throw from the "square" are the woods. What reason the people have for existing, I found it hard to see.

I watched the awakening of the village with no little interest. First a couple of children came out and began to play in the sand, then the owner of the hogs brought a basket of corn and fed them in front of the temple of justice. There was just enough corn to whet their appetites for more, and the squealing went on all the more shrilly thereafter. A man came out with some rats in a trap, and the dogs began to battle for them. The one merchant opened the door of his store and sat down to wait for customers, who, apparently, never came. The postmaster bustled about and sent a boy galloping off, thirty miles to the railway, with a lank mail bag. The one lawyer went over to the court-house and resumed his examination of land-titles—the only genuinely flourishing industry of the village.

This was the boyhood home of a noted American humorist, and some of his best characters are said to be faithful portraits of the natives hereabouts. A special reminder is to be found of him in the records of the present court in the title of a land claim now in dispute,—"The Gilded Age" tract. This tract comprises some 50,000 acres of valuable timber land. It was originally included, or was supposed to have been included, in an old survey and grant, which gave as its *eastern* limit and boundary "the foot of the mountain and thence northward with the meanders thereof." In the course of time another grant was issued by the State, for a tract of land which was to run over the mountain from the east, and have as its *western* boundary "the foot of the mountain and thence southward with the meanders thereof."

As the land became more valuable, with the nearer approach of railroads and civilization, it became more and more difficult to precisely locate "the foot of the mountain," and to define its "meanders."

Under the careful nursing of vigilant attorneys, the dispute waxed hotter and hotter and the "foot" grew apace, until it covered this 50,000 acres. "There's millions in it," for the lawyers.

I did not find the village attractive enough to warrant a longer stay, so when the Colonel was ready to retrace his steps, I said farewell, and went forward alone. At the "settlement" the veneering of civilization was just enough to be distasteful. I preferred the mountain, pure and simple.

Bearing in mind Thoreau's saying, that "they are not true travelers whose legs hang dangling the while," I began "to wear away the soles of my shoes," as he enjoins, upon the mountain paths. The traveler who journeys on horseback learns much that must be missed by one who goes by rail; but only to such as go on foot is granted that infinite leisure that the acquisition of knowledge demands. To start upon an unknown road, on foot, careless of the end, and of time; stopping to rest when one tires, to eat where one finds food, to sleep where a bed is offered; to pause and listen to the carol of a bird, to the murmuring brook, to the whispering wind; to have leisure to note the clouds in the sky, the flowers under foot, the tints in the foliage of the trees; to pause for speech with them who are slow of words; to go into the homes of the people and see their lives—this is to travel, and to learn.

The dignity of the mountaineer is a marked quality, but it is not offensive or presuming. It can best be characterized by the prefix "gentle," but it is very genuine in its way; and the term gentle, foreign as it may seem to certain of their traits and to individual characters, conveys better than any other word, my impression of them as a whole. There is a pathos, too, in lives that are only an unvarying round of eventless monotony. Yet they are contented, for they know little of the great world, and have few ambitions.

They are ardently religious, and in the log meeting house, in the heart of the wilderness, will often remain together for hours—preaching, praying and singing, alternating with intermissions for eating and drinking. To these meetings the people gather for many miles about; the preacher is usually as illiterate as any, but being gifted "with the power of words" he can continue his exhortations almost indefinitely. The popular style of delivery is a peculiar, sing-song, nasal drawl, interspersed with many "ahs!" and an intermittent "sniffle" (if so inelegant a word may be permitted) which becomes very rasping to the unaccustomed hearer.

I am sorry to say that their morality is not always on a par with their religion. In some little matters such as temperance in drink, personal chastity, respect for the revenue laws, and for the command "Thou shalt not swear," they are a little below the standard.

Their absolute lack of curiosity is a point worth noting. If, in conversation, a word or term is used that they do not comprehend, they will not ask its meaning; they will not admit by word or look that you possess knowledge beyond their ken. If a question is asked which they do not understand, they will reply inconsequently. To illustrate this: A mining engineer was awaiting the arrival of his photographic outfit. He asked a native to go to the river with him to help bring the camera across. On the way the man remarked to an acquaintance whom they met, in perfect good faith, that he was going to the river "to help swim a camel over." This was said as if it was the most natural thing in the world that a camel should be expected. There was no curiosity as to why it should be brought, or the use to which it would be put. They are a delightful, simple, ingenuous people—and I love them. Why they should have remained so long so near the centers of civilization, yet unharmed by its degenerating influences, can hardly be understood by one who has not been among them. But they care absolutely nothing about the great world and its work; and, until the world discovered that there were things of more material value than men and women among these mountains—such things as timber, and coal, and ores—the world cared nothing about them.

The first of the settlers here were from Virginia and the Carolinas; some, doubtless, fugitives from justice, others men who followed the chase, and finding game plentiful, came here and lived amongst it. Such people had no interest in the outside world; the succeeding generations knew no more of it than they learned from their fathers; centers of civilization, though so near, were inaccessible except by long and tedious horseback journeys, which there was little motive for undertaking. The "mountain" remained isolated, while the world surged about its feet. But finally rumors of its wealth got abroad, of its timber, and its mines. Railroads and land companies have come, and are coming, to the mountain, and they are despoiling its bloom and freshness, so that they who would see it before it has been marred by the rude hand of civilization, must see it soon.

Agriculture in this region has heretofore been of the most primitive sort, and there has been nothing to encourage its development; ignorance, too, has been the handmaid of indifference.

There is very little level land on the plateau, and very little that the farmer of the Mohawk or the Miami valleys, accustomed to broad, rich bottoms, would term good farming land. There are very few farms of any large cultivated area. Yet there are now evidences of a coming change in the conditions that surround these mountain dwellers, and it will afford good opportunities for the industrious home-seeker. In the past, the soil has been cultivated only to such an extent as the necessities of the settlers made compulsory. As game gradually became scarcer, they were compelled to rely a little more upon the soil for sustenance. A little land would be cleared, or cultivated only with a preliminary girdling of the trees, for there is very little undergrowth in these woods. Corn was almost the only crop, and this was literally both meat and drink. Such necessaries as must be procured by money, or its equivalent, were bought at first with skins and furs, and later by digging the medicinal roots with which the mountain abounds. They cared nothing for wealth or gain beyond the needs of the present, and had they cared for gain, were too remote from markets to make agriculture a productive industry. Thus no land was cleared beyond that needed to supply their simplest wants; and, as land was plenty, no effort was made to retain its fertility, even had they possessed the requisite skill. The little clearings were tilled until they would produce no longer, then they were allowed to grow up to brush or timber again, and another piece taken for cultivation; the natural result was that the land obtained a worse reputation for fertility than it naturally deserved.

There was also another cause that operated to destroy the fertility of this virgin soil of the forest. The hunters and the Indians before them had been accustomed to burn the fallen leaves in the woods each year, that the wild grass might be enabled to start earlier, and thus afford good pasturage for the deer. Later, settlers who acquired some stock and pastured it upon the wild land, kept up the same practice. So that year after year that which would have added to the depth and richness of the soil was wantonly destroyed, and with it annually some portion of the acquired humus.

When one comes upon these abandoned clearings they are tempted to ask the old question, "Why do pine forests grow up where oaks have been removed, and why do oaks follow the pines?" Here the pine belts, the signs of the poorer land, have been replaced by thickets of young oaks; and the land which has been deemed best, because it was that on which the oaks grew, is being covered with pines.

But not for long now will the forests remain the predominant feature of the plateau. Meadows and fields of grain, flocks, vineyards and orchards all mirror themselves upon my page. Upon these hillsides girls will sing the "song of the vine" as they gather purple clusters for the wine-press; and the land shall be so "full of all blessed conditions," that "flowing with milk and honey" shall be its synonym.

JAMES K. REEVE.

THE RUSSIAN APRICOT.

OPINIONS AND EXPERIENCES OF A MUCH DEBATED FRUIT.

THE RUSSIAN apricot has been the subject of much diverse discussion during the last decade. By many it has been denounced in unmeasured terms, and by others it is considered one of the most valuable of recent acquisitions. We have endeavored to arrive at definite knowledge of it by securing the correspondence which follows.

The Russian apricot was introduced into America by the Russian Mennonites who settled in Kansas many years ago. We have not seen any record of the date of the first introduction, but it is earlier than is commonly supposed. It was grown so long ago as 1876, and probably much earlier. By the Mennonites it is propagated by seeds, and many of the trees now planted throughout the country are unnamed and chance seedlings. It is not strange, since the apricot varies from seed in the same manner as other fruits, that conflicting and diverse experiences have resulted. In late years some of the best varieties have been selected and propagated under names. The chief of these are Alexis, Nicholas, Alexander, Budd, Gibb, Catherine. Some or all of these have been distributed under two names.

It is always said that the Russian apricot belongs to the *Prunus Sibirica* of botanists, and the statement, so far as we know, has never been controverted. But in fact it is nothing more than a hardy race of the common apricot, *Prunus Armeniaca*. The foliage of the two species is very unlike. Fig. 1 shows the leaves of the Alexander, a Russian variety. The leaves are broadly ovate with a short point, broad base, short and rounded teeth, and they are smooth and shining above and thick in texture. It will be noticed that the petioles or leaf-stalks bear conspicuous glands. Fig. 2 is a faithful illustration of the foliage of *Prunus Sibirica* (or *P. Armeniaca*, var. *Sibirica*, as Maximowicz prefers to call it). The leaves are narrower than in the other, with long points and long sharper teeth, and the glands are lacking or are rudimentary. The leaf is thinner than the other, not shining, and both above and below it is very sparsely hairy. The fruit of this Siberian apricot is small, hard and dry. The leaves of the Russian apricot vary considerably in different varieties, but they never assume the characters of *Prunus Sibirica*.

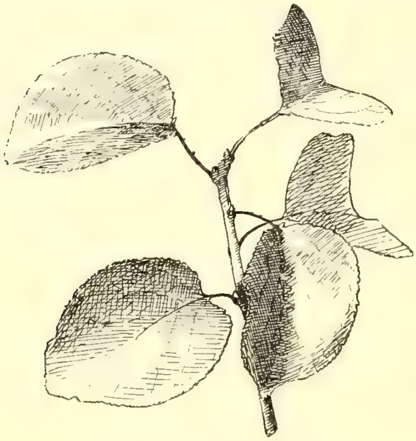


FIG. 1.—RUSSIAN APRICOT.

It is undoubtedly a fortunate circumstance that the Russian apricot has been regarded as belonging to the Siberian species. There are those who assume that individuals of the same species cannot differ perceptibly in hardiness, and if it had been known from the first that the Russian apricot is specifically the same as the older and common apricots, our literature would have abounded in statements that it is no hardier than the old sorts. But now that its greater hardiness appears to be admitted, we may reasonably hope to hold this as a proof that environment has much to do with the capability of a plant to endure severe climate. To be sure, there are almost no end of instances in which the same is true, but it is often necessary that a thing be proved to us while we are declaring that it is impossible! If the Russian apricot possesses no other merit than hardiness, it is still worth keeping, for it is variable and is capable of improvement. L. H. B.

FROM DR. T. H. HOSKINS, *Newport, Vt.*—I received young trees and specimens of fruit from Mr. Griesa, of Kansas, some six or seven years ago. The trees have grown well, but have been killed back in all winters when the mercury went down to 40°, which is so often in northeastern Vermont, that my apricot trees have not yet set any fruit buds. The trees sent me were seedlings, and there is an endless variety in the aspect and growth of the young trees. Probably not one seedling in fifty is likely to be worthy of cultivation, but when a fruit of sufficiently good quality is obtained, we have advanced one step, and a long one.

One distinguished merit of the Russian apricot is that it sets its fruit quite as freely, both east and west, as the common plum. It is well-known that along the Atlantic slope our apricot has always been found so shy a bearer as to be practically unknown among our commercial fruits. The Russian apricot, even if not sufficiently iron-clad for northeastern Vermont, may yet furnish a valuable fruit for lower New England and the middle states. In size, the specimens sent to me from Kansas were rather smaller than the Lombard plum. They looked like little peaches, and were eatable; but in comparison with California apricots, they would probably have been regarded as better adapted to the pig pen.

These apricots graft or bud readily on our wild plums, and are free growers, though they do not promise to make large trees. There will be no doubt considerable difference in this respect. They are well worth studying and experimenting with, but I think nobody has go far beyond the first stages in this work.

FROM JOHN CRAIG, *Central Experimental Farm, Ottawa, Canada.*—The Russian apricots as a class—and they do not seem to differ much in variety as far as tested here—seem to rank in hardiness with the Lombard plum. The trees lost several inches of young wood last winter, and also show evidence of injury to the stem. Alexis and Catherine appear to be most promising. They have good foliage and are vigorous growers. The soil and treatment depend somewhat on the stocks upon which these apricots are worked. They are doing well in many places on sandy loam, which tends to hasten maturing of wood in the autumn.

In advance of more extended tests, it would not be safe to call them "a valuable acquisition." I do not think they will be grown to any extent in peach growing districts, and it is questionable if they are sufficiently hardy to do well north of the peach line. They bud and graft readily on the myrobolan and American

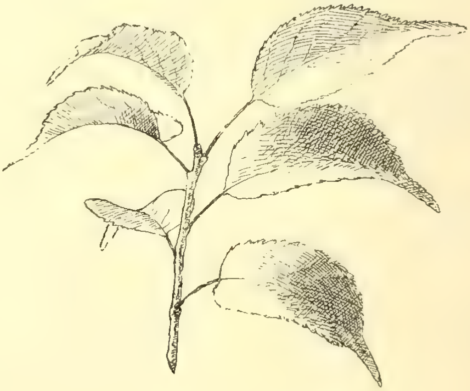


FIG. 2.—PRUNUS SIBIRICA.

plum (*P. Americana*). The latter, on account of its hardiness, I consider the most desirable stock. Crown grafts on this have made a growth of from two to three feet since spring, when they were set.

FROM R. G. CHASE & Co., *Geneva, N. Y.*—Russian apricots have proved hardy in this locality. We regard the Alexander, Budd, Alexis and Catherine as the best varieties. They seem to do well in our stiff clay soil, also in gravelly loam. How they would do on sandy loam, we cannot say. We think they should have cultivation and annual pruning the same as other orchard trees. They are a valuable acquisition where the finer or older varieties cannot be grown successfully. We have tested them by budding on peach, common plum and myrobolan stocks, and are inclined to use myrobolan exclusively hereafter.

but not having been able to make a careful study of the named varieties in the orchard, I do not feel like giving an opinion upon their relative merits. Those seen in the Mennonite settlements in central Kansas were quite small, of poor flavor and were affected by the curculio to a considerable extent.

In answer to the direct question from the editor, as to whether I consider them "a valuable acquisition," I would say from my present knowledge, No! There may, however, be some varieties with which I am not acquainted that would convince me to the contrary, and of this I should be very glad. The best stock to bud them upon is the native plum (*Prunus Americana*), although it sprouts badly. I have never seen it upon the Marianna stock, but I think this would be still better, as it does not sucker, and I think it will be hardy wherever the apricot will grow.

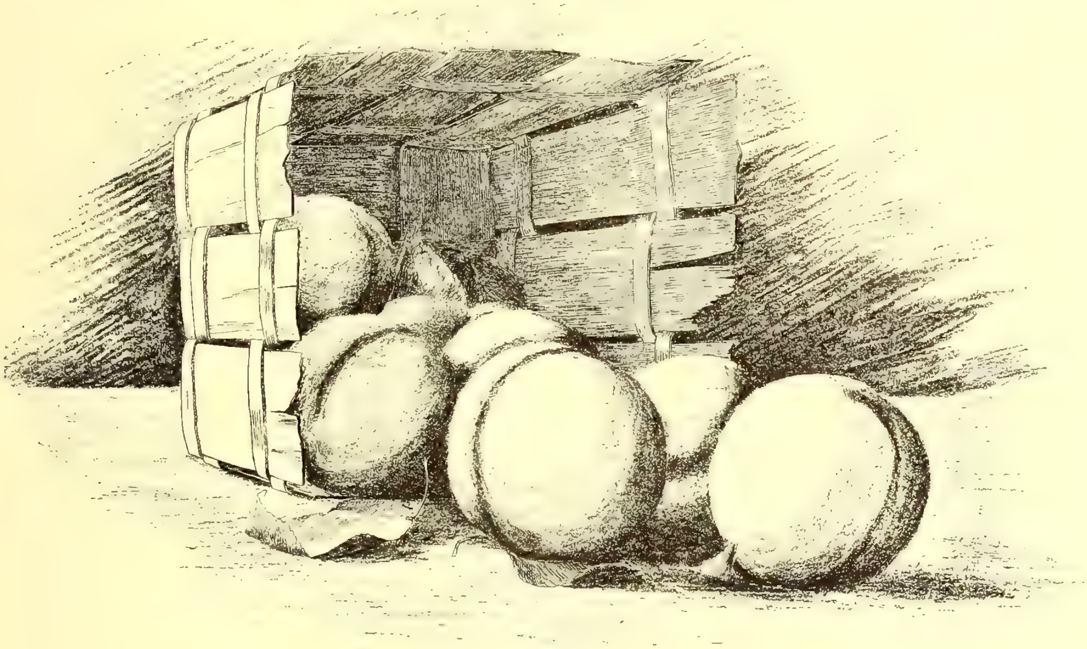


FIG. 3. RUSSIAN APRICOT, THE NICHOLAS.

FROM H. E. VAN DEMAN, *Department of Agriculture, Washington, D. C.*—In the first place, I think it is entirely proper to say that the apricot should hardly be mentioned as one of the fruits of Russia, for, according to authentic reports, it is only found in the vicinity of the Crimea, which is a very different and much milder climate than Russia proper. Because this little corner over which the Czar has domain is mild enough to allow the culture of the apricot, it is not wise to associate it with the fruits that generally grow in Russia. Having seen many varieties of the apricot growing in both eastern and western states which were called Russian, I might be justified in saying that they seemed similar in nearly all respects to the ordinary seedling apricots which are found all over the country. I think they are quite as hardy as the ordinary varieties of the peach,

FROM PROFESSOR E. S. GOFF, *Madison, Wis.*—Professor Henry set out six named varieties and six unnamed seedlings on our station grounds in the spring of 1887. The following winter all were killed down to the root, though most of them started anew in the spring of 1888. The next winter all were again killed down to the root, and several were killed outright. Most of those that started grew from the stock. During the last winter the remaining ones were again badly killed back, and as none of them showed any blossoms all were removed, so that at present we have not an apricot tree on the place. Evidently the Russian apricot is not adapted to Wisconsin.

FROM PROFESSOR J. L. BUDD, *Ames, Iowa.*—Some of the named varieties are fairly hardy on the college grounds, yet they are injured at the points of growth by our severest winters. They succeed best on high and dry soil. The treatment does not differ materially from that required by the plum, but more care should be given to spraying, as the curculio works upon them to a greater extent than on some of our native and Russian plums.

I first tested the fruit in south Russia in the summer of 1882. I did not then consider it superior for any use to the best native plums of the west for dessert use, and my opinion has not since changed. But it is superior for culinary use, and upon the whole a decided acquisition. In tree it is much hardier than any of the old sorts, the foliage is far better, and in all respects the best varieties are better adapted to our American soil and climate east of the Rocky Mountains. If not up to the required standard in fruit, we can soon improve it by crossing with the pollen of the best California varieties. In this line, I am glad to report that apricot pollen can be sent across the continent by mail without loss of vitality. We have germinated California apricot pollen six weeks after it was taken from the anthers. They work perfectly on seedlings of our western native plums (*Prunus Americana*), but we find they do not unite well with the peach, or with such foreign stocks as St. Julian or myrobolan.

Of the varieties we have tested and observed, the Gibb, Nicholas, Catherine and Budd, appear to stand well at the head. But the best of all in tree and fruit is Chinese, rather than Russian in origin. It was grown from a pit imported by the Iowa Agricultural College from the province of Shense, in northwest China. At first it was sent out for trial under the name of Chinese apricot. Later we named it "Shense," but in Nebraska it is grown by a few parties under the name of Acme. It does not come into bearing so early as some of the Russian varieties, but it makes a larger and handsomer tree, has larger and better foliage, and the fruit is larger, handsomer and better for any use than any of the Russian sorts I have seen in east Europe or here.

FROM CARPENTER & GAGE, *Fairbury, Nebraska*—The Russian apricot is perfectly hardy in southern Nebraska. We have seen a fair crop of fruit after 30° below zero. We consider the Alexander the best variety, although many varieties are good. It is a success in all kinds of soil in this state, but, like the peach, the buds are more liable to be injured on lowland than on upland. We find apricots on peach much better than on plum, as they make a better union.

FROM G. C. BRACKETT, *Lawrence, Kansas.*—The Russian apricot is not hardy in every respect in this state. Varieties are as numerous as peach seedlings, and a majority are as worthless. Selections can be made of varieties of superior quality and beauty. The sorts selected and propagated thus far have not proved productive, so far as reported from Kansas growers. Soil and treatment should be the same as for plums. I do not regard them preferable to such as were in use before their introduction to this state. There has not been sufficient time devoted to their testing to prove what is the best stock for their propagation. They make much the strongest wood-growth on the peach. I have several kinds grafted into branches of the Early Golden apricot as a test in comparison. They show no evidence which would give them a preference. They were first brought into notice by the Mennonites settling in Marion, Harvey and McPherson counties, and for a few years succeeded. I visited a number of orchards in Marion county, and found almost the entire crop ruined by curculio, plum gouger and scab, and found it very difficult to obtain half a peck of the fruit fit to bring away with me for my family and friends. Nurserymen said that it would prove a valuable substitute in regions where the peach failed; but I have yet to learn of a crop being grown in seasons when the peach failed, and last year when a good peach crop was grown, the apricot failed. I was strongly in hopes that it would prove to be all its friends had claimed for it. But so far it has not, and residents of the most favored counties report to me that it has not, nor will not become a profitable fruit. It may be profitable in successful peach regions and where it is exempt from late spring frosts, and even then will not prove superior to our old established sorts. It has been a nurseryman's hobby.

REPORTS OF KANSAS FRUIT GROWERS *in vol. 17, Kansas Horticultural Society (pp. 390-462, 1887-8).*—"Russian apricot trees have been planted and fruited. The tree is very hardy. I can see no reason why it will not prove profitable."—GEO. A. DEGROFF, *Marshall Co.* "Russian apricot trees have fruited in this country and are considered profitable."—JOHN O'TOOLE, *Norton Co.* "From observations, I am favorably impressed with this fruit, and would not hesitate to plant it for profit." —J. W. KNODLE, *Phillips Co.* "Russian apricot has proved to be an entire failure in this locality."—J. B. AVERY, *Washington Co.* "The general seedling class is a failure."—H. H. KERN, *Wyandotte Co.* "Russian apricot has been fruited in the county, and would be profitable if protected from injury by the curculio. It is now regarded as of no more value than other sorts." —J. W. BYRAM, *Chase Co.* "Russian apricot has failed in a crop of fruit during the last two years."—M. HALL, *Harvey Co.* "Russian apricot trees are not profitable to grow."—THEO. BOGGS, *McPherson Co.* "Russian apricots are grown in the Mennonite settlements in the northeast part of the county, and are considered profitable."—B. P. HANAN, *Reno Co.* "The Russian apricot is not considered a profitable fruit to grow."—JOS. REYNOLDS, *Crawford Co.* "The Russian apricot is not considered profitable for this country."—D. MORRISON, *Kiowa Co.*

FROM C. M. STARK, *Stark Nurseries, Louisiana, Mo.*—Russian apricots are quite hardy here; we have also tested them at Denver, where the climate is even more trying, and apples like Maiden Blush, Missouri Pippin, Northern Spy, etc., do not stand, and they are hardy—hardy as Richmond cherry.

The best sort is doubtless the Shense; then Alexander, Alexis and Budd; Gibb and Catherine, less desirable; Nicholas discarded. Preib, Evatt, Smith, Byram and Remer are identical with the five just named. Mr. Remer distributed scions both to nurserymen in Kansas and Nebraska, but to each without the knowledge of the other, hence there was no intentional deception upon the part of introducers. The Kansas man obtained scions a year ahead, but lost them, so the Nebraska collection was sent out first.

Perhaps it is too soon to say how much farther north than the common French apricots the Russians will prove valuable; but it is not a question of hardiness in tree, simply of early blooming and consequent liability to injury by frosts. To say the least, they promise an occasional crop, especially when trained on walls, etc., where it would be hopeless but for the Russians.

Peach stocks should be avoided, also myrobolan; native plums are good, except that they sucker, and are variable as to hardiness. We believe the best stock, not only for the Russians, but for all apricots, is the Marianna plum. Five years ago we sent apricots on Marianna to California and other states, and thus far trees are in perfect health and vigor.

FROM T. V. MUNSON, *Denison, Texas.*—As to hardiness, Russian apricots have endured our climate pretty well, though some suffered from the long continued summer. It is rather too far south for them.

I grew trees from seed obtained from Nebraska, grown by Mennonites, and budded from the best trees that bore fair or good very early fruit. I have not tried named kinds of the Russian, but see little difference specifically between the Russian seedlings and other varieties in cultivation, such as Early Golden, Moorpark, etc. I understand the apricot to be a native of Russia in Asia, growing in thickets on the head waters of the Yenisei, Obi and other rivers, consequently would expect it to be suited to such regions as Western Texas, Colorado, New Mexico, Utah, Nevada, Central California, etc., where the atmosphere is dry and proper irrigation can be had. Here the apricot generally blooms too early and gets killed by late frosts. The best soil is a calcareous loam, with sand or gravel enough to make it porous. They should be fertilized with potash manures, and generally treated as are peach trees.

So far as I know, the "Russian" varieties, or those of more recent introduction from Russia, are valuable owing to their early fruiting, extreme earliness and productiveness and endurance of the climate of the northwest where most older varieties fail from extreme cold. But few of the varieties, however, are really valuable. Most of the seedlings, as with seedlings of other classes of fruits are worthless, being either sickly, too small or too poor in quality to justify planting in orchards.

They appear to do best upon peach stocks. I have them upon Marianna plum stocks, but they are not old enough to speak of their permanent success thereon, though so far they appear healthy and vigorous enough.

CONCLUSIONS.—The following statements appear to be warranted by the above correspondence:

1. The Russian apricot is somewhat hardier than the peach, and may be expected to endure the climate a degree or two north of the peach belt.

2. It blooms early and is liable to injury from late spring frosts.

3. Seedlings vary widely and many of them are worthless.

4. The fruit, even of the best sorts, is much inferior to that of the older and better known varieties of apricots.

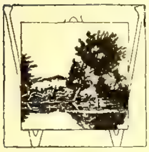
5. There is promise of considerable improvement under proper care and selection.

6. It is particularly liable to attacks of the curculio and plum gouger.

7. It works well upon common plum, upon *Prunus Americana*, Marianna, peach and myrobolan. It is probable that Marianna or some other of the native plums will be found to be the most desirable stocks.

8. In general, it appears that on the northern limits of peach culture the best varieties of Russian apricot are worth cultivation on a limited scale; and they may increase in value with further attention.

PROMISING WILD FRUITS—II.



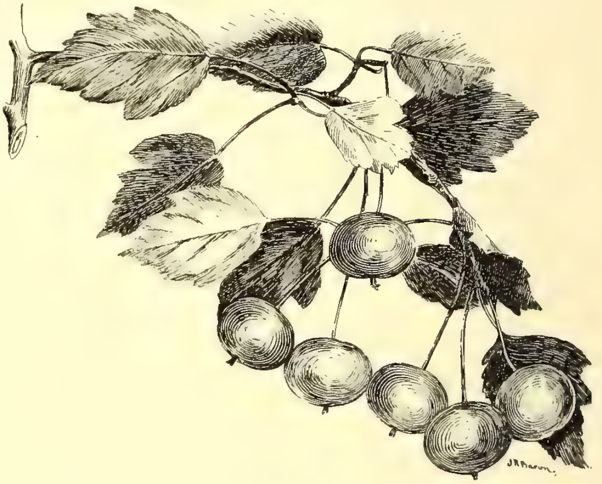
WILD CRAB (*Pyrus coronaria*). No one will contend that our present cultivated varieties of the apple meet all the requirements of apple culture in the United States. There are too few long-keeping varieties of high quality, especially for the south. The north requires trees better adapted to withstand the winter. The prairie states of the upper Mississippi valley need varieties capable of resisting both excessive cold and heat. In fact, our ordinary cultivated apples, which have been developed from *Pyrus Malus*, a native of the comparatively moist, mild and uniform climate of Europe, find themselves adapted to only a limited portion of this country, namely, from the upper Atlantic coast westward and southwestward to the prairie region, and to a portion of the northern Pacific slope. Elsewhere in the United States apple culture is precarious, or confined to few varieties, or favorable locations of limited area. The most important attempt to extend this area of successful apple culture has been the introduction of cultivated varieties of *Pyrus Malus* from Russia. These have proved partially successful on our northern borders east of the Great Lakes, but in the prairie soil and climate westward, they have failed so largely from blight, sunscald, and the lack of keeping qualities, that less is now expected of them than when they were first introduced. These partial failures, have served to call the attention of fruit-growers to our native crab-apple as a possible source of varieties for cultivation.

The natural range of the American crab-apple at no point extends far beyond the present limit of successful apple growing in the United States, and it often comes short of that limit. But, as varieties of *Pyrus Malus* have been produced which are more hardy than the original species, so also it is hoped that the range of the American crab-apple may be somewhat extended by cultivation. That this extension of territory may be accomplished, westward at least, seems probable from the fact that nowhere in the United States is our crab-apple more abundant and fruitful than on the border of the prairie belt where the cultivated apples begin to fail. Certainly much may reasonably be expected, so far as adaptability to climate is concerned, from a species which in that respect is already so nearly all that can be desired. That our wild crab will lend itself readily to improvement may be inferred from its variability in the wild state. The size of tree, shape of leaf, size and shape of fruit differ much in different localities. The tree, which reaches twenty-five or thirty feet in some portions of the Ohio valley, becomes a shrub less than ten feet high on the drier prairies west of the Mississippi. The leaves, which are usually deeply lobed, are sometimes found almost entire, resembling those of the cultivated apples. The narrow-leaved *Pyrus angustifolia* of the southern states is little more than a variety of the ordinary crab-apple of the north. The fruit of the ordinary crab-apple (*Pyrus coronaria*) which is usually depressed-globose, about an inch in diameter, is sometimes found of twice that size, and in the west an oval variety occurs, in the same localities as that of the usual form. On some trees the surface of the fruit is distinctly ribbed, on others it is uniform. The quality of our crab is certainly as good as the "austere, uneatable fruit" of the wild crab of the Old World, from which nearly all our cultivated varieties have sprung. Indeed, for making preserves, cider, and for some other purposes, the crab in its present wild state is highly valued, and was largely used by the settlers before cultivated fruits were introduced. Its excess of acid is, in fact, one of its most promising features, as it is seldom that fruits gain in acidity by domestication, and there is little doubt that an increase in size will be accompanied, in some of the varieties, by a toning down of the excessive acidity.

But perhaps the most valuable character of the wild crab is its lateness of maturity, rendering it a probable source of winter varieties. The fact that the apple is practically the only long-keeping fruit we have, is alone a sufficient reason for efforts to increase the number of valuable late varieties adapted to all localities and uses.

BUFFALO-BERRY, (*Shepherdia argentea*). For the cold dry northwest, hardly any of our native fruits is of greater promise than the buffalo-berry of that region. As an ornamental plant, it is occasionally grown, but for the production of fruit it has, until recently, attracted but little attention. In its wild state the fruit is used by settlers in the portions of the country where it grows. The name buffalo-berry is derived from the former custom of eating the berries as a sauce with the meat of the buffalo. The names blood-berry and rabbit-berry have also been applied to it, and it has been called by some writers cornelian cherry, but this name properly belongs to *Cornus Mas*, a European tree of the dogwood family.

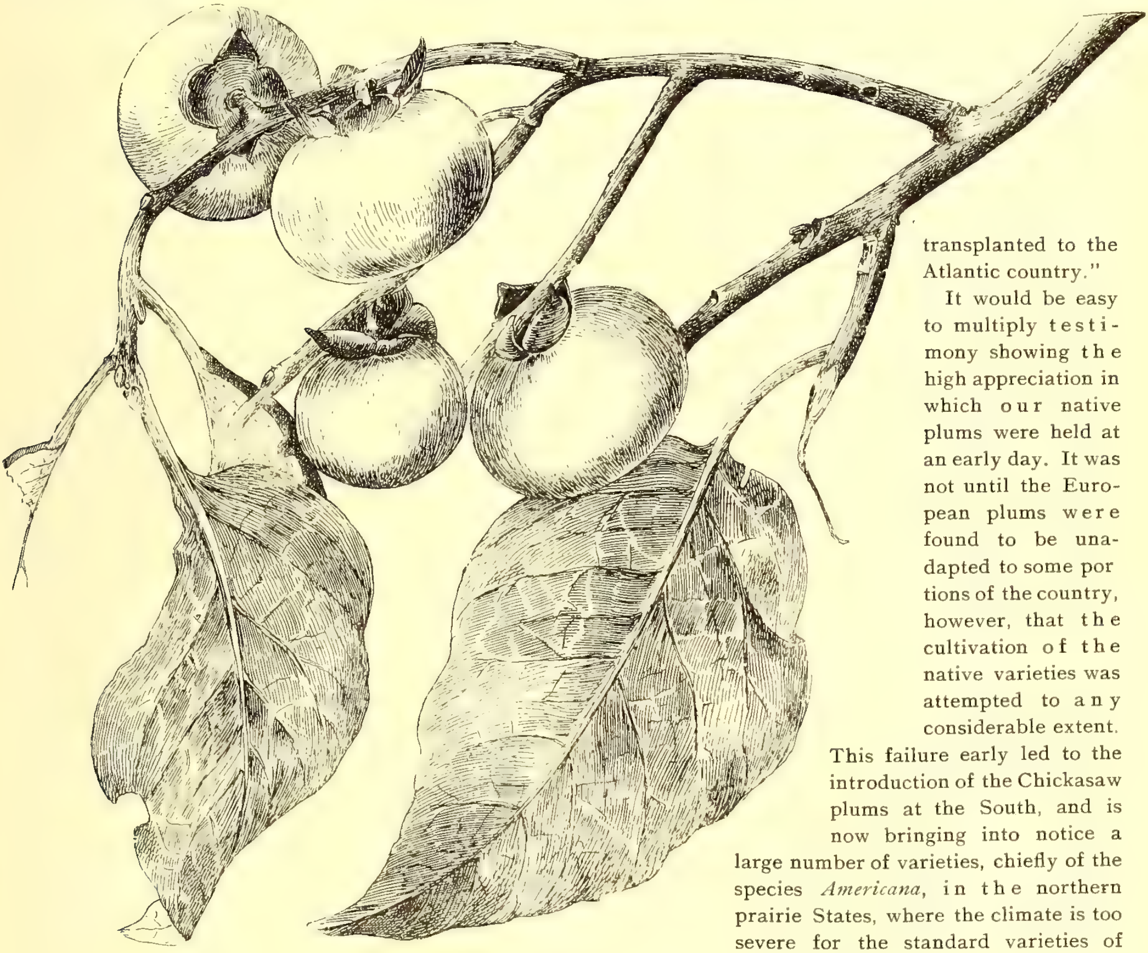
The buffalo-berry occurs mainly along streams on the eastern slopes of the Rocky mountains and the adjoining plains, from the Saskatchewan southward to Colorado. The berries are about the size of small currants, of a fine scarlet color, and are produced in such abundance as to give the shrubs late in summer, or early in autumn, a showy appearance. The fruit is quite acid, and is relished by nearly all persons, being esteemed by some superior to currants. The tree is propagated by suckers, cuttings, or seeds. The flowers are diœcious, and the failure to produce fruit under cultivation has sometimes been due to the presence of plants of but one sex. In mild climates, however, it sometimes blossoms so early that no fruit is formed, owing to the flowers being killed by frost.



WILD CRAB (*Pyrus coronaria*).

PLUMS, *Prunus Americana*, *P. angustifolia* (*P. Chicasa*). Many varieties of these two native species are already in cultivation, and are proving better adapted to large portions of the country than the well-known varieties of *Prunus domestica*. For the southern states the Wild Goose and other varieties of have proved admirably adapted, while at the north, where these varieties are not so successfully grown, the native *Prunus Americana* is furnishing varieties better in quality and more hardy than those which have been hitherto in cultivation. In size, firmness of flesh, and regularity of bearing, however, most of our native plums thus far introduced into cultivation leave something to be desired. Our wild plums are so much superior, however, to the European wild plum, from which our older cultivated varieties have sprung, that we may confidently expect great improvement in the future, and that the plums of America, developed from the native species, will ultimately be superior to the best of those now grown in Europe.

Although wild plums are found throughout the larger portion of the United States, it is along the wooded borders of the prairie country in the Mississippi Valley that they occur in greatest abundance and variety. The quantity and excellence of the wild plums were often the subject of remark by early travelers in that region. George Catlin, in an account of his travels near the mouth of the Red river prior to 1840, after speaking of ridges of timber containing a profusion of wild grapes, says: "The next hour we would be trailing through broad and verdant valleys of green prairies into which we had descended; and after finding our progress completely arrested by hundreds of acres of small plum trees of four or six feet in height, so closely woven and interlocked as entirely to dispute our progress, sending us several miles around; when every bush that was in sight was so loaded with the weight of its delicious wild fruit that they were in many instances literally without leaves on their branches, and bent quite to the ground." Flint, in his History and Geography of the Mississippi Valley, published in 1832, says: "Prairie plums are most abundant in Illinois and Missouri on the hazel prairies * * * some of them are large and delicious. * * * The yellow osage plums of this class, when the better kinds are cultivated, are among the most delicious plums we have eaten. So rich and delightful a fruit, and so easily cultivated, well deserves to be transplanted to the Atlantic country."



Native Persimmon (*Diospyros Virginiana*).

It would be easy to multiply testimony showing the high appreciation in which our native plums were held at an early day. It was not until the European plums were found to be unadapted to some portions of the country, however, that the cultivation of the native varieties was attempted to any considerable extent. This failure early led to the introduction of the Chickasaw plums at the South, and is now bringing into notice a large number of varieties, chiefly of the species *Americana*, in the northern prairie States, where the climate is too severe for the standard varieties of *Prunus domestica*.

For example, Mr. U. S. Hollister, of St. Paul, Minnesota, in a report to the American Pomological Society, says, "The 'tame' plum will not do with us. The best natives are largely cultivated and doing finely. The De Soto is one of the best. Each neighborhood seems to have its favorite plum, and they are good enough for us."

The agricultural colleges of Iowa, Wisconsin, Minnesota and other states, have been instrumental in introducing and disseminating valuable varieties of native plums, and the nurserymen of the northwest are enterprising in their efforts to secure the best varieties.

BEACH PLUM (*Prunus maritima*). This well-known plum of the Atlantic sea-shore is well deserving of attention for the purpose of obtaining improved varieties for cultivation in the peculiar localities to which it is adapted. Especially is this true since it appears to be remarkably free from the attacks of the curculio. The plant is a compact bush, usually three to four feet high, though sometimes almost prostrate in exposed situations. The fruit is nearly globular, often an inch in diameter, though in one variety no larger than a small cherry. The color varies on different trees from crimson to purple, and the flavor, though sometimes austere, is often agreeable when fully ripe, especially if grown in exposed situations. The fruit is quite largely used in the localities where it grows, and often finds its way into the markets of New York and other Eastern cities.

CACTUS.—In the southwestern portion of the United States, from central Texas to the Pacific ocean, the cultivated fruits of temperate, and of semi-tropical climates, can be grown only by means of irrigation, or in mountainous sections, or other limited localities favorably situated with regard to moisture. This whole region, comprising about one-half the arid lands of this country, is the home of the cactus in many species. These peculiar plants, especially adapted by nature to desert regions, bear, many of them, fruits of excellent quality, some of which are destined to furnish an important article of food to the inhabitants of the territory in which they are found. The fruits of several species of opuntia have long been largely consumed by the people of Mexico, and are now occasionally sold in the markets of New Orleans and other cities of the United States. One of them, *Opuntia vulgaris*, has been taken from America to the countries bordering the Mediterranean, where it is extensively cultivated and known as the Barberry fig. On the island of Sicily, there are said to be 10,000 acres under cultivation to this cactus for its fruit, which is largely consumed by the poorer people of that island and of Italy, forming a considerable portion of their food.

Of the 140 species of cactus native in the United States, more than two-thirds have edible fruits, some of them of superior quality. The flavor of different species has been compared to that of the gooseberry, the strawberry and the fig. Among the species worthy of mention for their fruit, are *Opuntia Ficus-Indicus*, which though not native is naturalized around old missions in California and New Mexico, *Opuntia dulcis*, and the following species of cereus: *giganteus*, *Engelmanni*, *Thurberi*, *Fendleri*, *triangularis*, *grandiflorus*, *stramineous*, *polyacanthus* and *enneacanthus*. Of these, *Cereus giganteus* is perhaps the most noteworthy, though possibly not so promising for cultivation as some of the opuntias. It is the largest species of the cactus known, growing in favorable locations fully fifty feet in height, but usually appearing from ten to twenty feet in height. Its fruit, which is pear-shaped, and two to three inches long, is somewhat like the fig in flavor, and was largely used by the Indians, both fresh and dried. There are many more or less distinct varieties of this cactus, differing in the form, color and flavor of their fruit.

Further notes on edible cactuses may be found in the cactus number of THE AMERICAN GARDEN (Aug., 1890)

PERSIMMON (*Diospyros Virginiana*). Those who know the persimmon only as it is seen in abandoned fields and along roadsides at the south, can form but little idea of the capabilities of this tree for improvement. The development of the culture of the Japanese persimmon within recent years in the United States has especially called the attention of our fruit growers to this, our leading native species. There is no apparent reason why, by artificial propagation and attention, there may not be as good varieties developed from our native persimmon as have been obtained by the Chinese, Japanese and South Sea Islanders from *Diospyros Kaki* and other species of the east. That superior native varieties of our persimmon exist is probably not generally known, and doubtless since the settlement of the country many such have disappeared. In Flint's History and Geography of the Mississippi Valley, published in 1832, persimmons are mentioned "of the size of a common horse plum," and the writer adds, "when the small blue persimmon is thoroughly ripened it is even sweeter than the fig, and is a delicious fruit. If the best kinds were cultivated and purchased from beyond the seas, it would probably be much more known and used than it now is."

J. S. Mathews, of Monticello, Arkansas, reporting to the American Pomological Society, says: "We have varieties here ripening from the first of August until Christmas. They are immensely productive, never fail of a crop, and, excepting possibly the fig or banana, are the most nutritious of all fruits."

The only noteworthy attempt at the improvement of our persimmon, which has come to our notice, is one which was conducted in France fifty years ago, and reported by Mr. A. J. Downing in the *Horticulturist*, for 1846, as follows:

"We observe, in the *Bon Jardinier*, that two intelligent French horticulturists, Messrs. Reginier and Audibert, have been raising seedlings of our native persimmon, *Diospyros Virginiana*, in the hope of producing finally an excellent edible fruit. Their efforts have already been attended with the most promising results. M. Audibert has produced a seedling with large round fruit, double the size of the original species, the flavor of which recalls that of a Mirabelle plum. M. Reginier's best seedling he has named *Plaqueminier Pierquin*, Pierquin's persimmon, in honor of one of his friends. The fruit is as large as a hen's egg, oval, acuminate, of a golden yellow color, and an agreeable flavor. These gentlemen intend continuing their experiments with successive generations of persimmons raised from their new varieties, and there is every reason to believe that they will be rewarded at last by a variety which will prove an admirable addition to the dessert."

For some reason, probably owing to the introduction into France of improved varieties of persimmons from Japan about that time, these American persimmons failed to come into general cultivation. The Japanese varieties now cultivated in the United States leave, however, enough to be desired in the way of flavor, hardiness and other qualities, to fully warrant well directed and continued effort toward the improvement of our native species, and we believe good results are to come in this direction.

Washington. A. A. CROZIER.

TESTED RUSSIAN FRUITS AT THE WEST.

IN THE September number of AMERICAN GARDEN the careful and thoughtful Dr. Hoskins gives some notes on the Russian apples of the Department importation which have been tested in the north-eastern states, and expresses regrets that the plan of distribution had resulted in the loss, or at least the hiding from public view, of a large part of the 250 varieties imported, and the mixing of names and numbers to a confusing extent.

In connection with his statements permit me very briefly to give a historical sketch of our importations of Russian fruits and collections from other sources, with some notes on the results of a very extended trial of the varieties on varied soils and in varied latitudes during twelve of the most trying years known to the history of the west and northwest.

OUR IMPORTATIONS OF SCIONS AND PLANTS.

During 1877 the writer was in correspondence with Dr. Edward Regel, of St. Petersburg, and Prof. R. Shroeder, of the Agricultural College near Moscow, in regard to the fruits of the steppes east to the Volga, and south to the Black and Caspian seas. As I knew that these eminent scientists and promologists had been educated in Germany, and that they were well acquainted with the fruits of southwest Europe, I was somewhat surprised by their statements that in size, appearance and quality the apples, cherries, plums and prunes of east Europe in the interior provinces compared favorably with those of Germany.

In the summer of 1878 we sent drafts for 100 roubles to each of these gentlemen with the request that varieties of the interior provinces be forwarded if obtainable through their interior correspondents.

In March, 1879, we received in good order scions of 72 varieties of the apple and small plants of a number of varieties of the pear, cherry, plum and prune from Dr. Regel, and in May we received scions of 164 varieties of the apple, and rooted plants of a number of varieties of pear, plum, cherry, prune, dwarf juneberry and other things in the line of shrubs and trees,

During the winter of 1878–9 we also received apple scions of the Russian varieties from Ellwanger & Barry, of Rochester, N. Y., A. G. Tuttle, of Baraboo, Wis., and from the Department of Agriculture, at Washington, the latter being cut from bearing trees by special arrangement made by Senator Kirkwood. At least two specimen trees were started, by top-working on Gros Pomier or Duchess trees set in experimental orchard the preceding spring, of about half the varieties collected. The large part, however, of the scions collected was root-grafted, or crown-grafted, on one year Duchess trees in nursery, and in due time sent out to trial stations over a large part of the west and cold north.

In the experimental orchard we also top-worked scions of quite a large number of promising seedlings from Montreal, North Wisconsin and other sections with trying climates, in the spring of 1879, with a few of the hardiest varieties of the old list. No further importations were made until the fall of 1882 and the spring of 1883 and 1884.

In the summer of 1882, in company with the lamented Charles Gibb, I was permitted to spend four very busy months with the horticulturists and among the orchards of northeast Germany, Poland, and nearly all parts of Russia in Europe, from the Black Sea and the Caspian north to St. Petersburg, Moscow and the upper Volga.

This resulted in making seventeen separate importations from northeast Germany, Poland and various parts of the interior steppe provinces as noted in our bulletin of 1885, and in part in the report of the American Pomological Society for 1887. As the varieties imported at this time were personally selected on the ground, and forwarded by the most careful orchardists and pomologists of the east, we expected that they would all prove true to name and serve as checks for correcting mistakes made in the Department list and by less skilled parties in other importations.

In reality this expectation has been realized, though many of the varieties were mixed to a much greater extent than the varieties we imported earlier, selected by Dr. Regel and Dr. Shroeder. This mixing was not so much the result of carelessness as we at first supposed. At the agricultural colleges the scions were mainly cut from top-worked trees on which often four or five varieties were fruiting. That a common workman should now and then cut from an interlocked limb is not surprising. Again the cherries, plums and prunes *were on their own roots*, and our experience with sprouts would lead us to expect some mixing from crossing of roots and seedlings. This kind of mixing we were soon able to detect, but not soon enough to prevent receiving many scoldings for sending out mixed stock. It could not be avoided, and has resulted in getting some very valuable varieties of the cherry and plum, for which we have had to coin new names. With the exception of the cherry, plum and other rooted plants, the varieties introduced since 1882 were propagated and sent out for trial to trial stations—now about 800 in number. The setting of a new orchard was deferred on account of the difficulty of keeping specimens on public grounds ransacked by hundreds of students, residents and outside visitors and prowlers.

Yet in the spring of 1888 we set in Experimental Orchard "No. 2" all the most promising varieties of the orchard fruits not included in orchard set in 1878 and 1879.

Except in a small way these trees are not yet in bearing, but they will have great interest and value in the near future. In the meantime we have received reports and specimen fruits from nearly all varieties on trial, and the older orchard has produced several hundred bushels of fruit.

SYNOPSIS OF RESULTS.

Apples.—The summers and winters during the past six years have been the most trying known to the history of the west on orchard fruits. So far as I know the wreck of western orchards has known no parallel in the world's history. On the college grounds the old orchard of 1,200 trees, planted prior to our experimental work with the Russian fruits, was totally wrecked *and is now a clover field.* Of the 118 varieties—the hardiest of the old list—the Duchess, Whitney's No. 20 and Tetofsky were the only really sound trees left when the orchard was grubbed out. In like manner our pear, European plum and cherry orchards of the old lists have been destroyed and the stubs dug out. Over a large part of the state, east of the Missouri divide, this orchard wrecking has been as complete as with us, yet on certain ridge soil, where the wood has ripened better in autumn, many varieties of the grade of hardiness of Cole's Quince, Fameuse, Wealthy, Gros Pomier, Plumb's Cider, Willow and Talman Sweet have stood fairly well.

In the experimental orchard the seedlings, and standard varieties on Gros Pomier, have mainly been grubbed out, and a number of varieties of the Russians have been njured by blight or sunscald.

Yet the fact remains that, taken as a whole, it is now the thriftiest and healthiest orchard east of the Missouri divide in Iowa, and has borne very heavy crops of fine fruit for all seasons from July to March. Last year and this we were able to show at our State Fair fully one hundred varieties of handsome and good fall and winter apples for either desert or culinary use. In estimating the quality of Russian fruits, two main facts must be taken into consideration:

(1.) The Russians grow many varieties of fine even-sized apples which are alone used for cooking.

The descriptive list of the varieties we imported from Moscow found in the report of the Montreal Horticultural Society for 1886 will illustrate this. The varieties recommended for cooking as a rule have some astringency when eaten raw, such as is found in the Silken Leaf, Hibernal and Recumbent, yet *they* contain more grape sugar than our common apples, and are not excelled for culinary use. (2.) The varieties Dr. Shroeder recommends for table use and cooking, or exclusively for table use, are always mildly acid, sub-acid or sweet, and with a tenderness and sprightliness not found in our apples classed by Downing as "good" or "very good." While there are no varieties as high in quality as Early Joe, Dyer, Grimes' Golden and Jonathan, we have many for all seasons that will rank with Early Harvest, Porter, Fameuse, Wealthy, Domine and Baldwin. This is especially true of the apples from Oral, Voronesh and the Bogdanoff estates, but they are not infrequent in the collections made by Dr. Regel and Dr. Shroeder. As with our common apples, the highest quality is not found with those that keep longest with common care.

The story of quality, season, relative value, etc., of the varieties longest tested is told in our Bulletin of 1890 as accurately as it can be done until they are handled by the barrel and binfull.

Pears.—In all parts of the world the pear seems to do best on high and dry ground with plenty of air movement and air drainage.

The college grounds are not naturally pear soil, and a large portion of the Iowa drift soil is not well suited to the pear. But on the prairie ridges, and the bluffs adjacent to our streams, the Russian pears are proving true ironclads, and coming early into bearing. Some of the varieties are fair in size and quality for dessert, but most of the eastern ironclads are best for culinary use.

Cherries.—The Russian cherries seemed to do well in nearly all soils from the western coast east to the Volga.

In like manner they appear to do well here on extremely varied soils *when on suitable stocks or on their own roots.* On the college grounds not a sprout of the old varieties can now be found. Yet the Russian varieties, cut severely for scions and bud sticks since the plants were set, are models of health and fruitfulness. Some varieties have not failed to give full crops in three years. This season we have had from about thirty varieties of cherries in regular succession for fully eight weeks, picking the last September 15th, being the second crop borne on Brusseler Braune trees which yielded a heavy crop on the 6th of August. This variety and two others are peculiar in producing two sets of blossoms nearly two weeks apart. If frost does not prevent one crop from setting, the trees always bear two distinct crops two or three weeks apart.

As stated by Mr. Gibb, some of the most valuable eastern cherries for both canning and dessert are slow in ripening after they turn red. Hence, they are exposed to the birds for a long time. Where grown in quantity those taken by the birds will hardly be missed, while the few trees can be covered. Many of these cherries, however, ripen early and evenly. So far as tested, all of them are higher in quality than Early Richmond or English Morello, and some of them are sweet or very mildly sub-acid. They will prove acquisitions over a very large part of our country.

Plums.—The Russian plums have far exceeded public expectations, and indeed, our own.

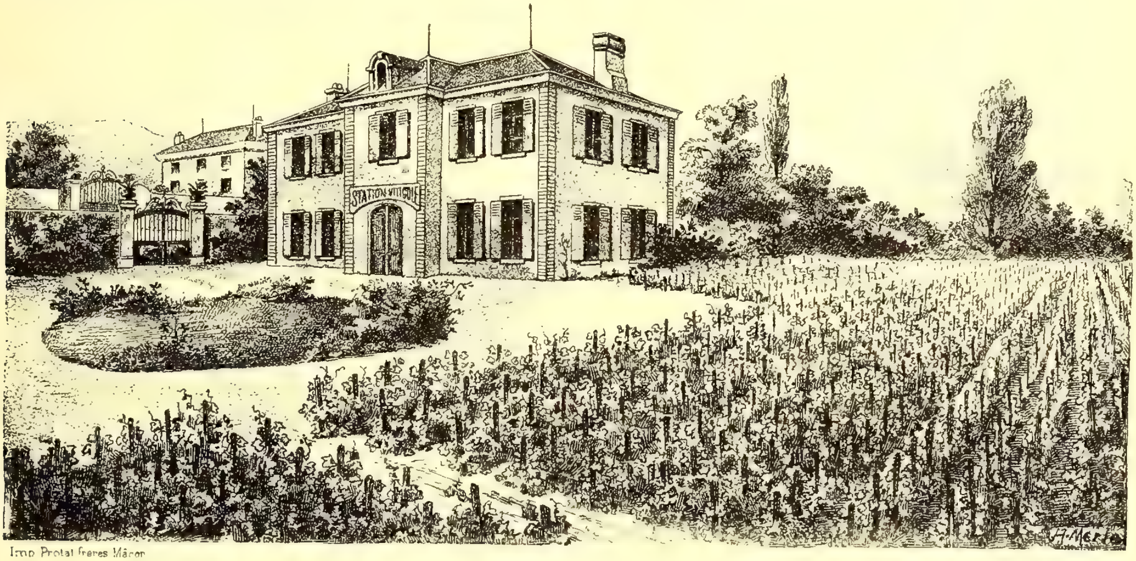
This year I have seen and tasted specimens of Early Red, Dame Aubert, Voronesh Yellow, Moldavka and other sorts, much larger and better than I ever saw in Russia. I am glad to report that some of these plums do not suffer more by attacks of the curculio and gouger than our best natives, and they are proving as hardy in tree and as free from rot and other diseases.

Prunes.—Some of the eastern prunes have also exceeded expectations in size and quality of fruit and hardness of tree. Of those well and widely tested, the Black Prune and the Ungarish have been most liked The latter variety is really equal for any use to some of the varieties grown in California.

Apricots.—So far we have not tested any Russian apricots that will be likely to prove valuable on our soil or in our part of the west. The Shense apricot, from northwest China, is the most valuable variety yet tested, but this is not hardy enough to prove profitable north of the 42d parallel; where it is hardy it is likely to prove of considerable importance.

J. L. Budd

Iowa Agricultural College.



Imp Protat frères Mâcon

The Grape Station at Villefranche.

SCIENTIFIC GRAPE-GROWING IN FRANCE.

THE VITICULTURAL STATION OF VILLEFRANCHE.

THE greater part of the agricultural, and especially the viticultural, regions of France possess scientific establishments, agricultural schools or stations which, by their work, their researches and their discoveries, aid the viticulturists, unfortunately so much troubled, and indicate to them the safe course to follow.

The Beaujolais were in need of such a guide. The viticultural station at Villefranche supplies this want.

It is situated in the center of Beaujolais, essentially a grape-growing country, which has acquired a universal reputation for the quality of its wines. All this vast vineyard has, in its turn, been ravaged by the phylloxera. And, to-day, when all these hill-sides are covered with foliage as formerly, the grower painfully sees the number of enemies attacking the vines increasing each year. He must continually be on the alert in finding new remedies for the new diseases.

Never has the grower been busier with all that is connected with the vine; defense against insects, fungi physiological diseases and atmospheric conditions, adaptation and improvements in pruning, methodical culture, perfecting the processes of vinification, treatment of diseases of vines, etc., etc. It is with the view of study all these questions that Mr. Vermorel has founded at Villefranche a viticultural station, the motto chosen being "Progress by Experience."

If the station is well located, so its equipment leaves nothing to be desired. Mr. Vermorel has done everything in regard to the number and importance of the labors which it is designed to undertake.

The buildings comprise a physiological and pathological laboratory, including a hall devoted to microscopic work. This laboratory is also connected with a greenhouse, divided into several compartments in which are raised the plants upon which the experiments are performed.

A chemical laboratory, in which special attention is given to analysis, and a studio for photography, also form part of the station. In the midst of all the buildings is a large hall occupied by the museum and the library.

A meteorological observatory forms an indispensable complement to the various laboratories.

The station is situated on a low hill in the center of a vineyard of about 15 acres, which it uses for experiments. About 70 acres, planted in vines and situated near Villefranche, also belong to the station. Experiments with fertilizers are being carried on, and 20 acres of the poorest land have been reserved for this purpose. On another plot over 500 varieties have been set out.

Among the numerous questions which it is proposed to study in this station, pathological agriculture occupies one of the principal places, and in this vast branch the entomological division will be the object of particular attention.

To complete the utility of the station, Mr. Vermorel proposes soon to open a winter course on the plan of the many now existing in Germany.

A review, published every three months, gives an account of the work in the laboratory and experimental fields.

Although just established, the station at Villefranche has already shown its utility, which will increase from day to day. Three bulletins have appeared, giving accounts of the interesting work undertaken. All these experiments have a great practical value, this being particularly the aim of the station, although a large space is reserved to purely scientific questions. Among others we cite complete studies on the cochylis; the pearly glands of the vine; comparative experiments on the treatment of anthracnose; a new parasite of the cochylis; destruction of the white worms.

It remains for us to add, that the disinterested example of Mr. Vermorel is bearing fruit, and that soon, in various parts of France, similar stations will be erected. All those who undertake this work will render a service to the State of the greatest importance — *Progres Agricole et Viticole.*

WINE-MAKING AND GRAPE-GROWING.

AN ACCOUNT OF METHODS IN THE FAMOUS KEUKA LAKE REGION OF WESTERN NEW YORK, BY THE SECRETARY OF THE PLEASANT VALLEY WINE COMPANY.

HOW shall we make wine from grapes? That depends entirely upon what kind of wine you wish to make. If it is a white wine, first secure good ripe grapes, look them over carefully, remove all rotten, green or other imperfect berries, put them through any grinder or machine that will simply break the skins, put them in any kind of a press, and press them sufficiently to express the must. Put this must, or pure juice, into a clean cask, and into the bung place a syphon that empties into a tub or pail of water, and let the wine ferment. This syphon excludes the air and at the same time allows the gases produced by fermentation to escape. When fermentation has ceased, put a loose bung in the place of the syphon, and let it rest until the wine becomes clear, then draw it off into another cask that is perfectly clean and sweet, fill it full, bung it up and wait; time will do all the rest. In about two or three years you may go into your cellars and be sure of finding a good, pure, wholesome wine.

The making of champagne is more complicated, and we would advise anyone going into this business to engage the services of an expert. However, a general outline of its manipulations may be interesting. The wine which has been selected for this purpose, the product of many vineyards and many varieties, is carefully blended, and just here great skill is required that this blend may be so made that no particular flavor of either is prominent, but that the whole shall bring out that peculiarly fine flavor found only in first-class champagne.

Now this wine is ready for bottling, which is done during the warm weather of spring or early summer, when it undergoes a second fermentation in the bottle. Here another test of skill is required. Should there be too much saccharine matter left in the wine, the fermentation will be so strong that the bottles will break and the whole be a loss; should there not be enough, there will be too little fermentation so that the wine will have very little effervescence, and be flat and insipid. But should this critical period be successfully passed and the fermentation be just right, it is then put down into deep vaults where it remains from two to three years, until the wine has become thoroughly ripened. At this time the wine has the sediment which was deposited during the fermentation (as no fermentation can exist without producing a sediment). It is then placed upon racks, where it is shaken twice each day from three to five weeks, until the sediment is entirely deposited upon the cork. It is then taken, tipped downward, to the finishing room where its first cork is extracted, and with it the sediment in this process, and part of the wine is lost. This is what is called disgorging. It then receives a small dose of syrup, made of pure sugar crystals, dissolved in old wine. It is then re-corked, with as fine a cork as can be found, costing from five to eight cents each, and after it has been tied down, wired, labeled, capped, etc., it is ready for shipping. During this process each bottle is separately handled from two to three hundred times, and the result is a wine fit for the gods.

A few points concerning the growing of grapes with particular reference to wine making, may be useful. The land should be a gravelly soil upon a gentle slope, with a southeasterly exposure. If the land should be at all inclined to be wet, it should be thoroughly underdrained, and sub-soiled.

The vines should be planted in rows at least eight feet apart and from six to ten feet in the rows, according to the vigor and variety planted. Concord should be not less than ten feet; others less vigorous, eight, and Delewares and others of that nature six feet. The hole should be dug to the bottom of the sub-soil, and at least two feet square, then filled at least six to eight inches with top soil, and the vine set upon that, and a covering of three to four inches of top soil placed over the roots, which should be spread out evenly, and then the balance of the hole filled with such soil as may be most convenient. A stake should be driven three feet long by the side of the vine, not only to mark the place where the vine is planted, but to tie the young shoots upon so that they may not be blown off by the wind. When planted, the vine should be cut back to two buds, and should both grow, after they are about a foot long one should be broken off and the most vigorous one tied up.

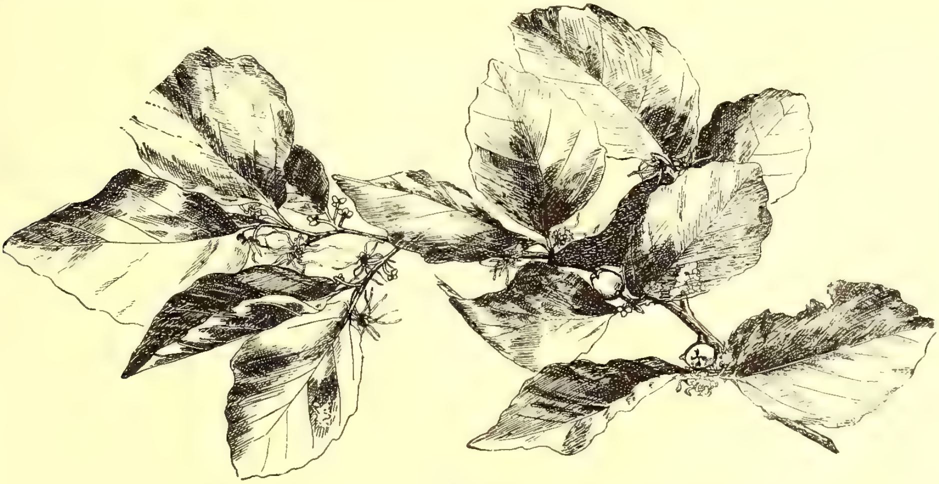
The land should be plowed and hoed sufficiently the first year to keep free from weeds. The next season the vine should be pruned back again to two buds. In those showing great vigor two canes might safely be allowed to grow, but those showing less vigor should grow but one cane during the second season, and the cultivation should be the same as the first year. Starting in the spring as soon as the ground is dry, it should be plowed, and from the vines. The next plowing, from the 1st to the 15th of July, should be turned back to the vines.

The third year the vine should be pruned back to about three buds, and this year there will be more or less fruit. And in the spring of this third year the vineyard should be staked and wired; that is, a stake seven and a half to eight feet long, sharpened upon one end, should be driven in the rows, leaving about three vines between each stake. And upon these stakes should be strung wires, about number twelve, the first about two feet from the ground, and the next two equal distances apart, sayabout 15 to 18 inches. This leaves quite a piece of stake above the top wire, but from year to year as these stakes are being driven farther into the ground the wires can be raised. This is the critical period of a vineyard, and no vines should be allowed to be overburdened with fruit, because if the vine is crippled at this time it will require many years of close pruning to bring it back; from two to five clusters is a good rule. The cultivation should be the same as the year previous. If the land upon which the vineyard is planted is reasonable fertile, it will probably require no fertilizer until the vineyard is from five to eight years old.

In this region Iona, Delaware, Catawba, Elvira and Isabella are probably the best wine grapes. No doubt the Iona is the best single all-around variety.

Grape growing was begun in this region over 40 years ago in a small way, and has gradually extended until this has become the largest grape-growing region in the United States east of the Rocky mountains, and it produces the largest quantity of genuine sparkling wine. In still wines, California has become a lively competitor because it has the reputation of producing good, pure, wholesome wines, some of which are entitled to be ranked among the best productions of the world.

Rheims, N. Y. D. BAUDER.

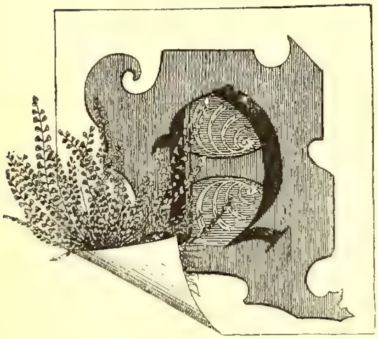


WITCH HAZEL.

“*Mysterious plant! whose golden tresses wave*
With a sad beauty in the dying year,
Blooming amid November's frost severe,
Like a pale corpse-light o'er the recent grave.”—TOKEN.

NATIVE FERNS.

THE CHOICEST PLANTS OF WOODS AND GLADES, AND HOW TO GROW THEM.



NATURE spreads her treasures with a lavish hand, but the majority of her worshipers gather up her flowers only, and fail to note the wonders of the cryptogamic world. They give but a passing glance at ferny dells, and see not the infinite variety of form and color which so delight the eyes of all devotees of the filices.

Fern gathering seems to create a progressive appetite for itself. Fern-loving people are never satisfied; the more they have the more they want, hence no fern-draped rock or shady nook is safe from these marauders. Fern culture is by no means confined to greenhouses and to imported species, and no lawn is now considered quite complete without its representation of hardy ferns.

Rockeries and fern-beds are desirable additions to any lawn if rightly managed, but I know of no more favorable situation for ferns than the narrow strip of ground between the foundation stones of a house and the channel worn by the drip of water from the eaves (supposing of course that the house be furnished with a wide jut). The advantages gained over other locations consist mainly in perfect drainage, coolness and sufficient moisture, all essential elements in fern culture. Partial shade is also desirable.

The question often arises as to kinds of ferns which will bear transplanting, and the prevailing impression seem to be that only the commoner sorts take kindly to cultivation. To convince all skeptics to the contrary, let me introduce my own collection of growing ferns, which occupy some thirty feet of ground on the east side of my house. Unscientific people, who shiver at the sound of long names, please turn a deaf ear while I present *Struthiopteris Germànica* for inspection. Tall, handsome and very tropical-looking, is it not, with its vase-like circle of foliage? This fern is commonly called the ostrich fern; it grows in moist places, often to great height, and is especially beautiful in early summer, before the pinnæ have fully straightened, as the segments then are curved like the plume of a veritable ostrich feather. As a good foil to the ostrich fern in point of color, we have the deep-green of Goldie's wood-fern, the king of all the aspidium tribe. Although abundant in certain localities it is by no means common. I know of no fern having richer, heavier foliage; full grown fronds are often two-and-a-half feet long and one foot wide. It is considered one of the finest ferns in the Eastern States.

But for real elegance in the fern family we must take off our hats to the osmundas. Can anything be more beautiful than the royal osmunda? Here are several fine specimens, stately and tall, yet graceful in form and delicate in color; the fertile racemose panicle at the summit of the fronds adds much to their beauty, and gives the name of "flowering-fern" to this species. Scarcely less attractive, but very different, is the cinnamon fern, *Osmunda cinnamomea* (Fig. 1). This grows in large bunches; the sterile fronds are clear-cut in outline, of firm texture and rich color; the fertile fronds

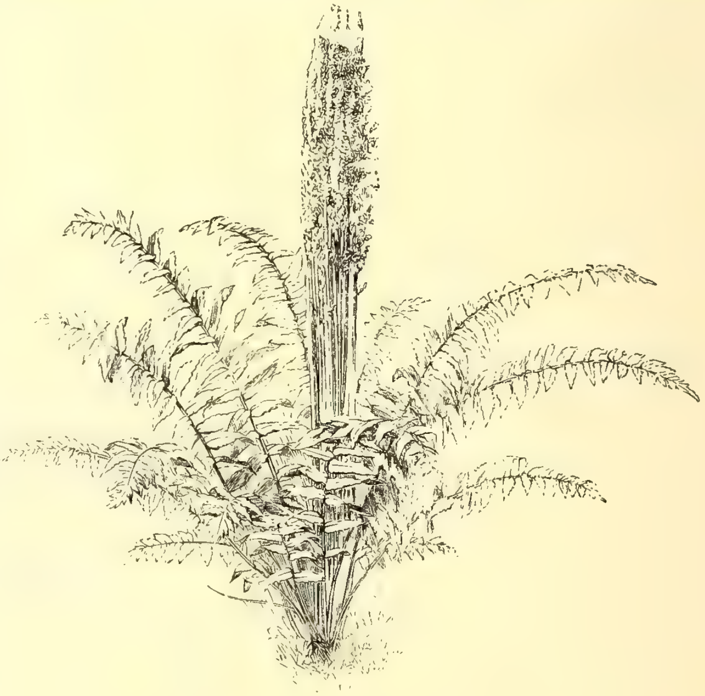


FIG. 1. OSMUNDA CINNAMOMEA.

are entirely distinct, although coming from the same root-stock; they are covered with cinnamon-colored sporangia, and when four or five of these tall spikes are encircled by the glossy green of the sterile fronds, the effect of the plant is both unique and beautiful.

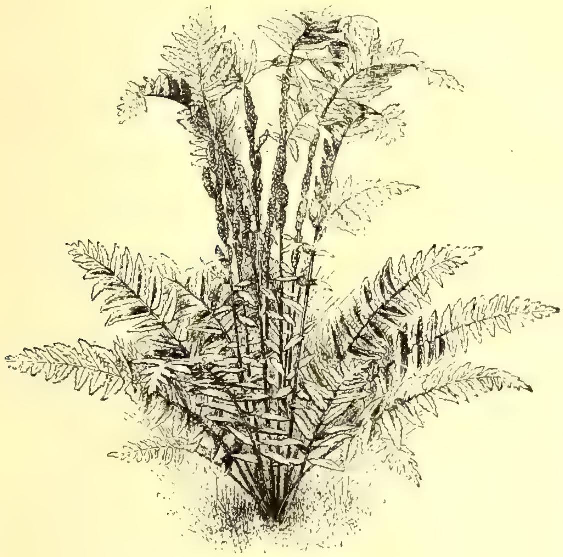


FIG. 2. OSMUNDA CLAYTONIANA.

Osmunda Claytoniana (Fig. 2), is the least attractive of the three; tall and handsome it surely is, growing somewhat after the manner of the ostrich-fern, but one cannot but feel that somehow nature made a mistake in placing the fertile pinnæ in the middle of a sterile frond; but there they are, dry and brown in the mass of green, giving the plant the appearance of having been smitten with a blight of some sort, and looking not in the least like a special design of Providence.

Adiantum pedatum, an old time favorite, speaks for itself; every one loves the maiden-hair, and it is not, as many suppose, difficult of culture. Contrasting finely with the delicate foliage of the maiden-hair are the grass-green fronds of *Onoclea sensibilis*. Just why such a coarse-looking fern should receive such a name was puzzling until we learned that the fern wilted almost as soon as picked, and that the segments have a tendency to fold themselves together face to face, hence the name *sensitive-fern*. The fertile fronds are not very common; they look like dense clusters of diminutive grapes, are nearly black in color and dry up in winter, but remain standing for a year or two.

Nearly all of the aspidiums are easy of culture, and I have some half dozen or more species; among them I consider *A. acrostichoides* very valuable. (Fig. 3.) It is the smooth glossy fern, improperly called rock-fern. The evergreen wood-fern, *A. marginale*, is also a good fern, and one to be depended upon to grow under adverse circumstances.

This strip of moss, thickly dotted with pert little ferns, one frond in a place, is none other than *Polypodium vulgare* (Fig. 4); the fronds are evergreen, smooth, from four to six inches high, and are simply and deeply pinnatifid; indeed one could fancy them all cut with a pair of scissors from a paper pattern.

One of the secrets of fern culture is to simulate natural environments as far as possible. For instance: the polypodium just mentioned was peeled from the top of a rock, where it usually grows in large mats or sheets; therefore I placed flat stones by the side of the house where I wished the fern to grow, dusted them over lightly with leaf-mould, packed the moss and fern upon them, and gave a thorough wetting. Likewise ferns which grow in the crevices of calcareous rocks are easily wedged in between bits of rock and stone; hence my success in naturalizing rare and difficult ferns. That long, slender, lace-like fern which has draped itself so gracefully against the gray building stone is *Cystopteris bulbifera*, or bladder-fern; this is the only fern in my collection which bears tiny bulblets on the underside of the rachis and pinnæ; these bulblets falling off grow rapidly, causing the great abundance of this fern in its natural haunts. At the base of this please notice the bluish-green foliage of *Pellæa atropurpurea* pushing its way from among the stones. I am proud of this fern, for it is fully naturalized, as this is its third year under cultivation. By the side of this is its sister fern, *Pellæa gracilis* (Fig. 5), the most fragile fern that grows. It is much smaller than *P. atropurpurea*, although similar in form, the recurved edges of the fertile fronds conclusively proving kinship. The foliage is deciduous and of pale green color. The plant is often found hanging like a fringe along the seams of rocks. Eaton tells us that it is rarely secured by collectors, because the root-stock is so hidden in such crevices; all of which goes to prove how little mankind knows of "what woman's wit when put to proof can do." Having seen fine specimens successfully fished out with a hair pin, I would suggest that such articles be added to the outfit of all

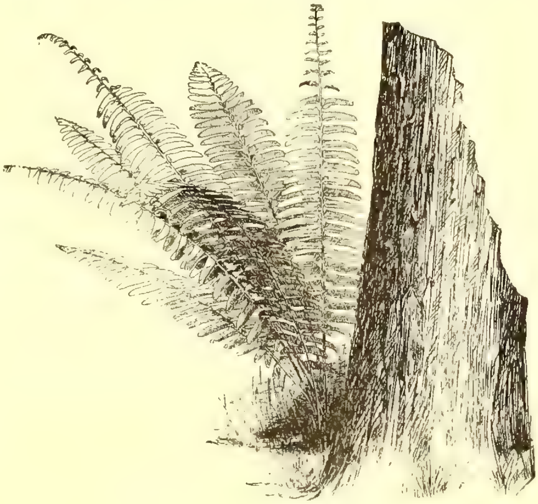


FIG. 3. ASPIDIUM ACROSTICHOIDES.

botanists! *Pellæa gracilis* does not always grow in this way. If the sporangia happen to fall on a shelf of moss-covered rock, the following season will find the moss supporting ferns; the specimens I have are thus embedded, and they are apparently doing as well as the polypodium with like treatment. I have faith to believe that this fragile beauty can be naturalized, although the test is not complete. The curious walking-leaf *Camptosorus rhizophyllus* grows very well from the rootstock, but does not "walk" from the apex, after the manner of its kind.

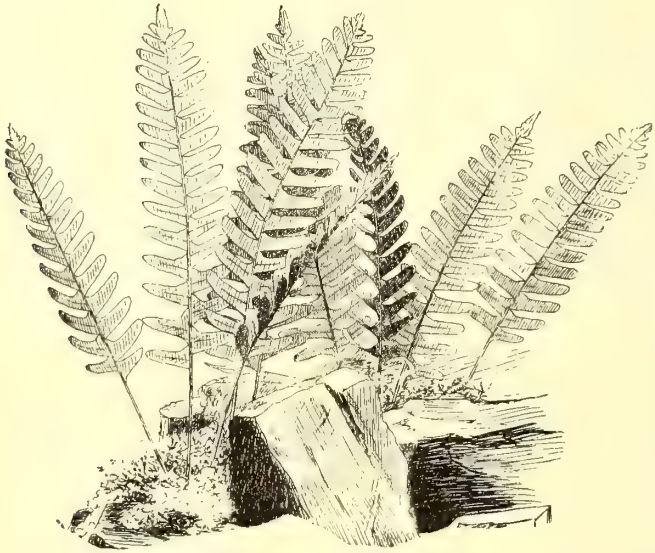


FIG. 4. POLYPODIUM VULGARE. (*Polypody.*)

Representatives of the spleenwort family complete my collection. *Asplenium ebeneum* always attracts attention, standing straight as a sentinel, some eighteen inches high and never over two in width; the stipe is black and shining, the pinnæ lanceolate in form, and evergreen. Lift the fronds of some of the taller ferns and you will find the daintiest fern of all, *Asplenium trichomanes*, sometimes called the maiden-hair spleenwort; this grows in tufts on the shady side of cliffs, and is wonderfully neat and pretty. A tuft of this is shown in the initial at the head of this essay. Close beside it is another tiny fern, *Asplenium ruta-muraria*. It bears no resemblance to any other fern and is very rare. Both have taken kindly to cultivation, and are as much at home as if hanging from the side of a limestone cliff.—G. A. WOOLSON, *Vermont.*

MY FERNERY.

My fernery is not a fernery at all. It is only the successful result of a long series of unsuccessful attempts to possess a cluster of the most fairy-like and pleasing of all our native wild plants.

And whenever I see a marsh bog pulled from its wet home and set out, in the delusion that the broken stalks and bruised leaves of what is wrongly called "a fern" will revive and take up the burden of life in its new surroundings, I am eager to tell what sad experiences have taught me. There is a homely saying that, "You may lead a horse to water but you cannot make him drink;" so you may transplant a brake from a swamp to ordinary garden soil, and water it as much as you will—it will not thrive. There are many flower-lovers who think, as I did, that the luxuriant growth of the brakes of cool, damp spots, such as one dreams of on sultry days, may be had in a corner or shaded spot in any cultivated garden. All that is needed is water and muck. Not so. The first essential is lacking—the ferns.

After many faulty efforts to grow swamp frailties, I discovered some ferns on dry soil that I concluded to try. To be sure, the plants were much beneath my ambition as to size, but they were dainty and would do to fill in with, and they have done so admirably. Where a few years ago I set out small, slender plants, every spring there now appear long, supple arms; and downy palms and fingers unroll two feet and more above the ground. And such thrift and liberality of leafage! We use the graceful plume-like fronds daily during the summer in bouquets and floral designs. If bits of cotton and tin-foil are wrapped about the stems of the larger fronds and they are tacked to the walls and wood-work of a room, there is a suggestion thrown out of woody depths with mossy banks, and crystal springs sparkling out of cold rocks. The fern with which I have been so successful is the lady-fern, *Asplenium Filex-fœmina*. It does not grow very plentifully in our woods, but still it may be found if sought, especially in northern exposures.

Then to my amateur collection I have successfully added a few roots of *Aspidium acrostichoides*, and adiantum, or maiden-hair, for variety. All are planted in leaf-mould sifted in the spaces of a rock pile originally made around an old cedar stump, which is now lending its decaying substance to the mysteries of

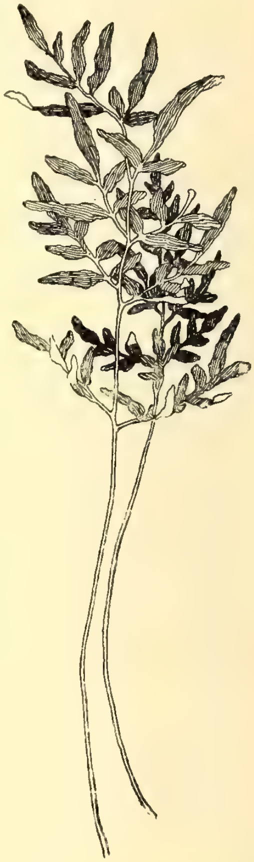


FIG. 5. PELLÆA GRACILIS.

fern formation. Moss, in such patches as are torn up in rambles to the woods, is laid snugly around the roots of my pets, and is pushed down out of sight as soon as it is dead, or a new piece is found. This, with the rocks, protects the roots from drying out. Surely we need but to be alert in order to make friends with our commonplace appearing neighbors, who gladly repay any well directed kindness.

—JENNIE BUELL, *Michigan.*

HART'S-TONGUE FERN.

The members of the genus scolopendrium, to which the Hart's-tongue (*Scolopendrium vulgare*) belongs, are so unlike other ferns that they hardly appear to belong to the same family.

The fronds of the different varieties vary from a few inches to two feet in length, and are from one to two or three inches in width. The leaf or frond is stiff and leathery in appearance; the midrib is very rigid and upright, and the leaf stalk, or stipe, tough and strong. The under surface of the fronds bears the spores in long rusty lines, extending in an oblique direction on either side of the mid-rib towards the margin. Each of these lines consists of a double series of spore cases. These are at first covered with a thin membrane, but this ruptures down the center between the double clusters and exposes the spore cases as they mature.

There are a number of varieties of this fern, and most of them show a preference for cool, moist, shady situations. Many of the handsomest of the genus are found in caves and among rocks on the sea shore, from which, in many localities, it has derived the name of sea-weed fern. The variety called crispum has a long frond, waved at the edge so as to resemble a frill or ruffle. It is commonly cultivated, and is increased by division of the roots, for it is always barren.

Another of the genus is called cristatum, and has the frond divided near the top, and each division is divided and sub-divided so as to form a bushy tuft. Digitatum is another crested variety. Its fronds are flat and resemble a hand with fingers spread apart. Abruptum has an oval frond, nearly kidney-shaped, which recommends it as a rare and pleasing variety for a collection.

Minute differences in the manner of toothing at the edge of the fronds, of dividing or branching, of expanding or modifying the lobes at the base, of cresting at the summit, of diminishing or increasing the length of frond, all give rise to varieties better appreciated and understood by professional cultivators than cared for by the amateur.

Perhaps the most curious fact concerning the Hart's-

YUCCA GLORIOSA, VAR. RECURVIFOLIA.—THE YUCCA RECURVA OF GARDENS tongue fern is the striking manner in which the young plants are produced. The process of germination of the spores or seed is carried on while the spores continue to adhere to the frond. Here they remain until the little plants become so large that the entire surface is hidden. As the weight of the young plants increases with growth, the old frond gradually droops to the ground, where it finally decays and leaves its parasitic infants to be nourished on the bosom of their mother earth.

These plants are of easy culture, and are indispensable both to the fernery out of doors and in the greenhouse. Their greatest merit is that of being an evergreen and growing more luxuriantly during winter than at any other season. The smaller growing varieties are admirably adapted to cultivation under glass, and all are of high value in a collection, as those will find who have tried them in a fernery.—Mrs. J. T. Power, *Kentucky*.

NIGHT GARDENS.

A GARDEN by day discloses only a portion of its beauties, and many people living near gardens are oblivious of the charms of their most familiar surroundings. Plants, like city people, sleep and wake at all hours. Those which revive at sunrise are inclined to sleep during the darkness. A sleeping garden is no romantic fancy of the poet. Any garden of plainest prose, where mosquitoes bite and weeds flourish, can give us strange and unfamiliar sights, but of this world, not of fairyland. Leaves sleep in positions very different from those assumed during their waking hours. The familiar clover brings its two side-leaflets together like the closed covers of a book, and the center one bends forward until it touches the others. Being natives of well-watered countries, they may do this to escape being beaten prostrate by rain. Those that like water, as do the geraniums, seem to twist themselves into cup-like forms to catch the dew. The drooping leaves of the grape vine are raised at the edges and depressed in the middle, and each little stem often leads a tiny streamlet on its way to the main trunk. Why is it some leaves want to catch the water and others shed it as rapidly as possible? Wistaria leaves droop as if in slumber. The common locust settles down early. The terminal leaflet hangs like a plummet, while the side leaflets dangle in rows. Some leaves hang as if drooping from excessive heat, but they do not feel as wilted leaves, soft and limp, but are crisp and firm. All sleeping foliage seems characterized by this curious stiffness.

The sleeping and waking of plants are governed by many causes aside from the flight of time. The brightness of the sky, the amount of dew-fall, or the state of the atmosphere all appear to exercise an effect on this beautiful and still mysterious phase of nature. Darkness does not cause it, for the portulacca closes its brilliant flowers while daylight lasts, and the sweet old mirabilis or four o'clock discloses its beauty and awakes to a more intense life before the sun has lost his power; then if his rays are fervent on the succeeding day the flowers wilt soon after they are felt, but on a cloudy day will often remain to greet the new blossoms.

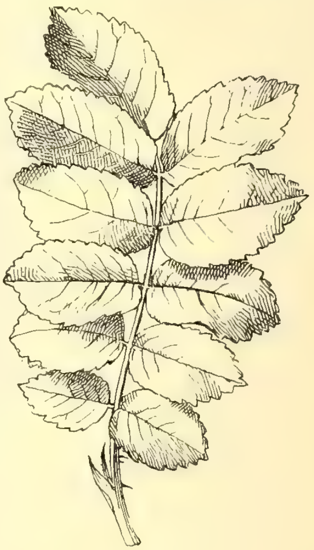


Fig. 1. 11-Foliolate Leaf. (*See page 665.*)

The day-lilies open at evening like the honeysuckles, and give their first and most delicious perfume to the night air. Although the ipomæas include the "morning glory," there are numerous kinds that, like the moonflower, are finest at night. Are we so fortunate as to have a lily pond, then we should raise the tropical nymphæa, which is one of the most beautiful of all flowers. Fitting companions to the lilies are the different forms of the night-blooming cereus. But it is not only to tropical strangers like these that we need look for beauty—at dark the œnotheras or evening primroses are in bloom. They come in nightly succession for weeks, and in dull weather endure through the succeeding day unless their frail texture is destroyed by rain. Their great yellow petals open and disclose a cross-shaped stigma and trembling anthers; and the flowers are made still more attractive by the faint, rich perfume which they exhale. The white-flowered night-blooming tobacco (*Nicotiana affinis*) should be more often grown than it is, and will be when it is better known. The datura is another beautiful night-blooming flower. It seems as if most trumpet-shaped flowers first open at night, and that the night bloomers are most abundant during the fervid heat of summer; while the flowers of spring open in response to the rays of the sun, and sleep when he is gone. Most scented flowers distribute their odor more liberally after dark, and some, like the tropical night-blooming jasmine, are odorless during the day and richly fragrant in the night hours.

Of all the glorious bloomers of the night, none equal the yuccas. See them where you will, in the wild moonlight of the forests, or on the shore of some southern lagoon, they are always beautiful when in flower. But none are finer than the yucca of our northern gardens (*Y. filamentosa*). When the hot weather comes it does not languish, but sends forth a slender stalk not thicker than a man's finger and over six feet in length, bearing aloft a load of flowers that exceeds in number those of all its companions of the garden. Three hundred buds and flowers can often be counted on one panicle. The blossoms hang like drooping bells during the day, half shut and showing little vitality, but at dusk they begin to breathe forth pungent and peculiar

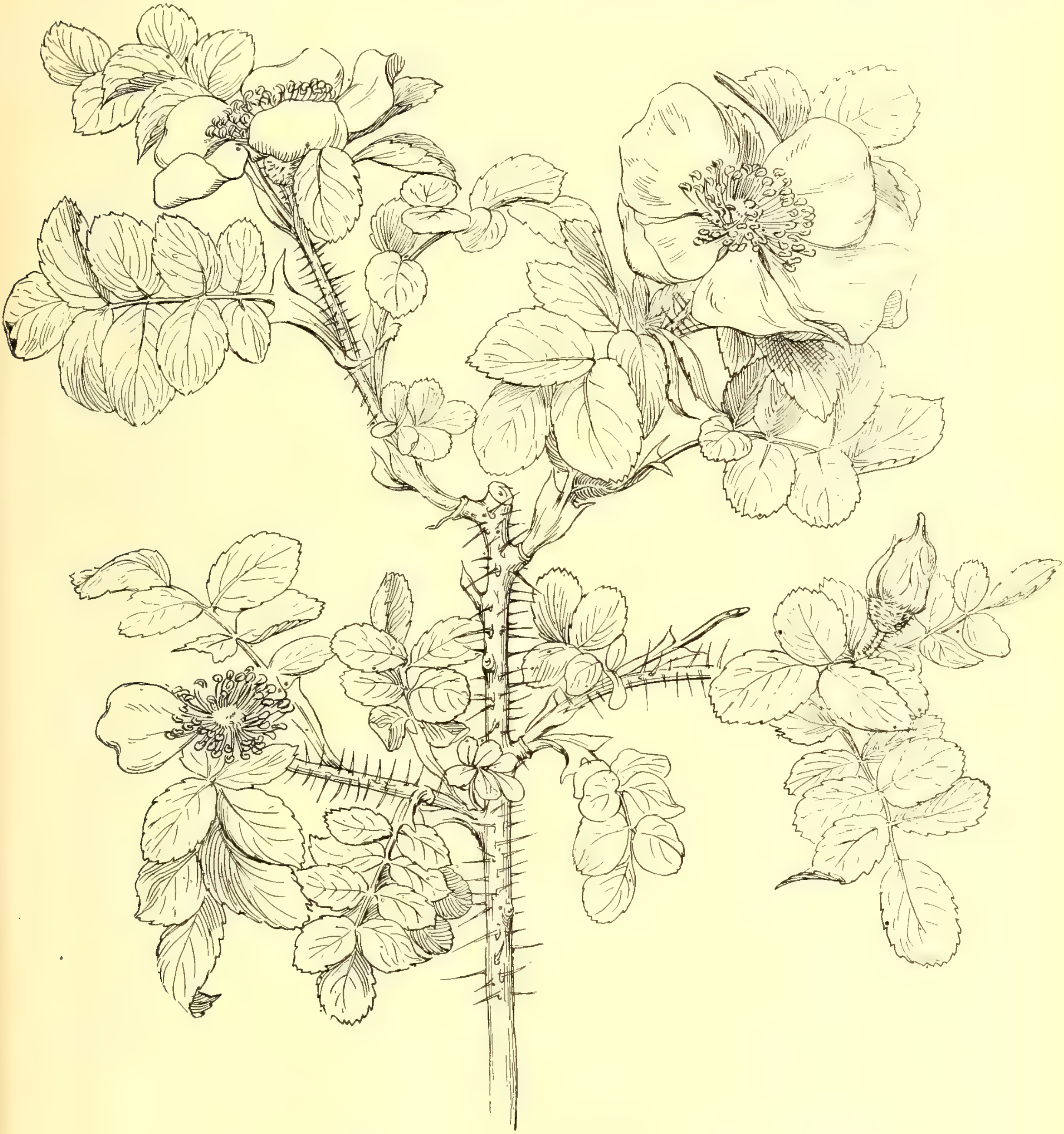


FIG. 2. A HYBRID ROSE.—HARRISON'S YELLOW × ROSA RUGOSA. (*See page 665.*)

odor, that increases as the night goes on. The flowers change their attitude, the petals being drawn backwards until the blossoms become white six-pointed stars, that catch the moonlight and seem to retain it in their hearts. The plant has an alert, wide-awake look, very different from its dejected air in the daytime. At night the plants form deep shadows, pointed and mysterious, from which the glistening flowers stand forth conspicuously and invite us to a closer acquaintance with their best estate. It is, after all, a mere figure of speech to speak of the sleep of the garden. Nature no sooner puts one set of plants to sleep than she supervises the labors and frolics of another. Night is full of life, as intense and as beautiful as that of the day, but not so fully appreciated by nature lovers.

John DeWolf.

PITCH-PINE BASKETS FOR ORCHIDS.

NOTES TRANSLATED FROM "LE JARDIN."

THE USE of baskets of pitch-pine is constantly growing more common among our cultivators. These baskets have long taken the place of pots for very many of the orchids, which, being by nature epiphytes, grow reluctantly in pots in which their roots are confined and are unable to reach the air.

For plants which are to be hung up nothing can equal the elegance of these prettily shaped baskets which have taken the place, in our green houses, of the old-fashioned pots, which were generally covered by an ugly growth of algæ and mosses.

The pine baskets are used in great numbers by the orchid fanciers. The simplest and most useful form is the simple square basket, used for dendrobium, cattleya, lælia, trichopilia, most of the oncidiums, etc.

A similar basket, but of twice the height, is especially suitable for the Indian orchids, such as ærides, saccolabium, vanda and angræcum. For phalænopsis, the high tubular or cylindrical form is the best.

Those who are willing to incur a little extra expense cannot do better than select the octagonal forms, single and double, which are admirably adapted to all orchids, but especially to the strong plants called specimens.

For stanhopea and acineta a special basket is made, round in form, with a bottom of copper wire, through which the subterranean flowers can find ready egress.

The hamper and log forms may be used to advantage instead of the heavy top and pieces of bark on which the Brazilian cattleyas, lælias and oncidiums of spreading form are grown.

They are simply filled with a light fibrous soil, to which the plants are firmly attached by copper wires. The hopper and manger forms are especially useful for the decoration of walls. They should be filled with ornamental foliage plants of trailing habit. The pot, cup and conical forms are less to be recommended, as they render the arrangement and cultivation of the plants more difficult. These pine-baskets are admirably adapted to the culture of bromeliaceæ of small size, and many of the ferns, such as adiantum, davallia, certain polypodiums, selaginellas, etc. They should be suspended, of course, and will thus form a pleasing addition to the greenhouse, the upper part of which is too often bare of vegetation.

All these baskets may be made at home, but if regard is had to beauty, strength and cheapness, it will probably be found better to buy them ready made. We have tried various makes, and prefer those of Aufroy, of Au-

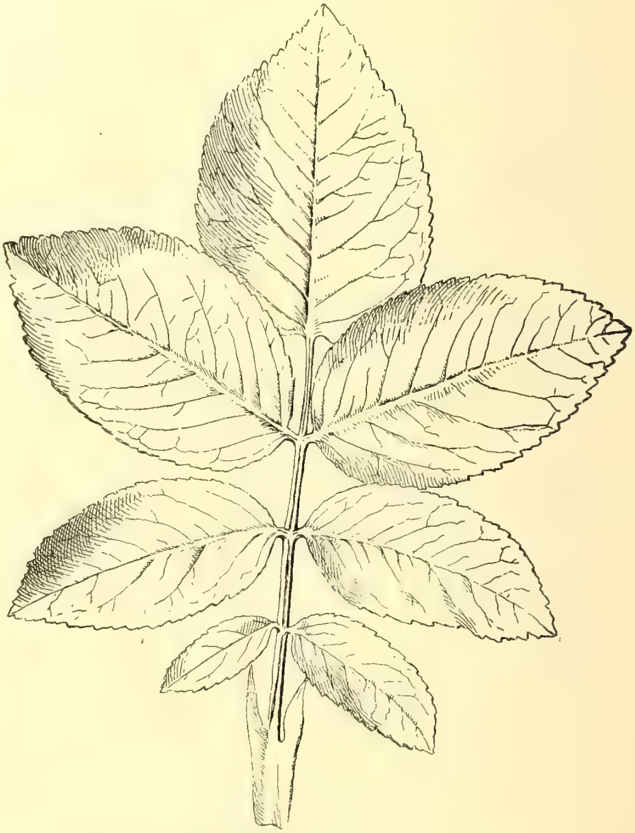


Fig. 3 7-Foliolate Leaf. (*See page 665.*)

dilly, which have rendered us good service for several years. The material is the best, the construction strong and the shapes very pretty. Furthermore, this manufacturer has had the good sense to leave the wood in its natural condition instead of covering it with varnish. Varnished and oiled wood is unsuitable, as the roots cannot attach themselves to it, and therefore perish, a circumstance of which the amateur does not think until too late to repair the mischief or to save the plants from destruction.—*O. Bullip.*

ROSA RUGOSA HYBRIDS.

A NEW DEPARTURE IN ROSES.

AN ILLUSTRATED account of the first hybrids with *Rosa rugosa* appeared in the June AMERICAN GARDEN of last year. No less than a thousand seedlings have been raised, most of which, however, have succumbed to mildew, to which these hybrids, notwithstanding the vigorous, healthy constitution of the mother, seem peculiarly subject. The male parent of the first hybrids was Harison's (properly spelt with one *r*) Yellow. Three of the seedlings resembled *R. rugosa* in foliage ; the rest were as unlike each other as children of the same parents well could be. These three plants bore double flowers of the color and odor of Jacqueminot. The best was placed in the hands of a prominent nursery firm to be propagated and introduced under the name of Agnes Emily Carman. The other two will be introduced or condemned, as they may be judged worthy or unworthy, after propagated plants have bloomed, either from cuttings or upon other stock. It is never safe to judge of the merits of a new rose from the seedling itself.

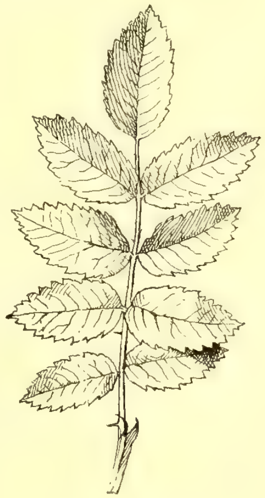


FIG. 4. 9-FOLIOLATE LEAF. FLOWERS PINK.

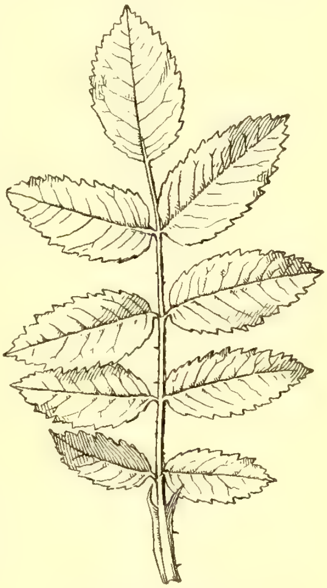


FIG. 5. 9-FOLIOLATE LEAF. FLOWERS PINK AND WHITE.

After the first summer, pollen was used from many different hybrid remontants, while for the past two years, pollen from yellow teas has for the most part been used, the aim being to produce a hardy, ever-blooming rose with the beautifully distinct habit and foliage of the mother plant, *Rosa rugosa*. Georges Bruant, which was placed upon the market two years after the Carman hybrid was announced, is a semi-double white Rugosa of great beauty. Whether it is hardy or not we cannot say say. But it will never be as popular as it would otherwise become, for the reason that its foliage mildews. We desire now to speak of the remarkable variations in the foliage, stems and habit of the rugosa hybrids, and for this purpose the illustrations (Figs. 1 to 10), true to nature, are presented. In-so-far as the writer is aware, self-rugosa seedlings are true rugosas. Of all the hybrids raised at the experiment grounds of *The Rural New-Yorker*, there is but one that could not be distinguished from its mother at a glance. This plant is a true rugosa in all respects save one : it blooms constantly from early spring until frosts, while, as is well known, the species take a little rest during July or August. The variations in these hybrids show that a definite answer to the question "What is a species ?" may not be given. Let us compare the illustration Fig. 2 with Say's rose, which appeared in the June AMERICAN GARDEN. They are in no wise related, so far as known. It will be difficult to find a single difference between them that would justify any one, seeing them for the first time, in pronouncing them distinct species. And yet our illustration shows with accuracy a hybrid between the Austrian rose, Harison's Yellow and the Japan *R. rugosa*. Fig. 1 shows an eleven-foliolate leaf (life size) of a seedling of the same parentage. It is a dwarf, scarcely a foot high, with tiny, semi-prostrate stems and a habit that is as different from either parent as can easily be conceived. Fig. 4 is the nine-foliolate leaf of a large, rank-growing bush which bears little pink single flowers only an inch in diameter. Fig. 3 shows leaflets of the Rugosa type, but the stems show only the rudiments of thorns. Fig. 5 has the habit of Harison's Yellow, and bears little pink and white flowers that resemble those of neither parent. Figs. 6, 7 and 8 show tea blood, and like a hundred others, just manage to live through the winters and make a feeble, mildewed growth during the summers.

Our readers will see that it is not easy to count upon the vigor of a hybrid seedling, or upon any other characteristics, by those of the parents. He will further see that such offspring do not of necessity, or in most cases, bear any striking resemblance to them. E. S. Carman.

The Rural New-Yorker.

SOME GOOD YUCCAS.

The group of yuccas, of which the cut (page 661) shows a member, has afforded our household and friends a great deal of pleasure for very little pains. About four years ago I obtained from John Saul, of Washington, among other plants, a dozen yuccas, comprising *Y. filamentosa* and its variety *flaccida* (*Y. flaccida*), *Y. gloriosa* var. *recurvifolia*, (*Y. recurva*), *Y. gloriosa* var. *superba* (*Y. superba*), and *Y. flexilis* (*Y. stenophylla*). They were all planted together in front of a shrubbery composed of lilacs, spiræas, viburnums, roses, altheas, Philadelphus, pyrus, Japanese weigelas, etc., the foliage of which makes a good back-ground for the spikes of cream-colored flowers of the yuccas. By planting out the off-shoots, we now have a large group, and the variety is interesting from the different characters of the foliage and the extension of the time of flowering. The greater number bloomed this year in April and May. To-day (October 2d) there are two spikes of superba that will open their bells during the week. The specimen of recurva (*Y. gloriosa* var. *recurvifolia*) that, by reason of its extra size and vigor, tempted me to secure a memento of its beauty by means of my camera, was at its best on August 26th. All prove hardy with me. The leaves from lawn trees and shrubbery that drift among them to the depth of six or eight inches in fall are left till spring, when they and any decayed foliage are removed and a little rotted manure scattered among them. This, in addition to cutting out the flower-stalks when faded, and pulling up the few weeds that appear, comprises all the labor expended upon them. For these slight attentions we have a tropical-looking evergreen plant that attracts notice at all seasons. Its appearance on a light carpet of snow is very striking.

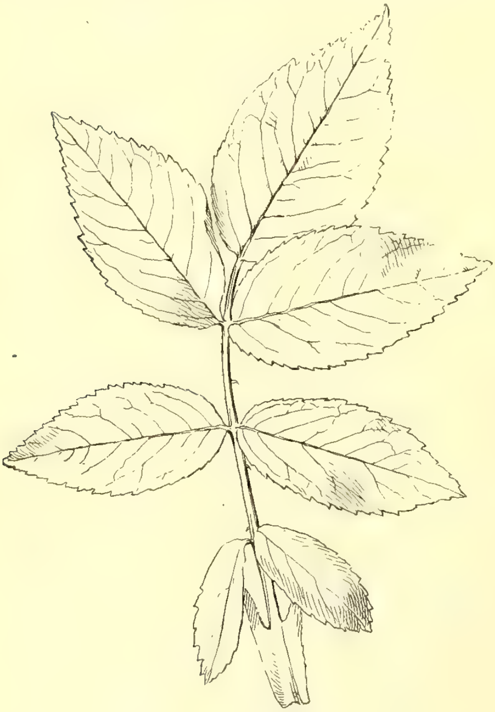


Fig. 6. Tea Blood.

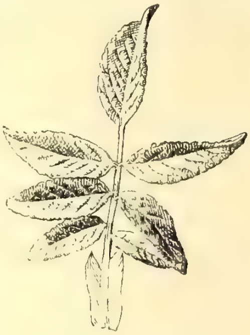


Fig. 9.
[Hybrid with long leaflets.]

How far north the yuccas would survive under this treatment I do not know. Filamentosa is the hardiest, and very striking with its white threads. With an extra bed of leaves and some pine boughs, I fancy it would endure a severe winter with impunity. It is well suited to the farmer's lawn, as its pointed leaves effectually repress cats, dogs, and fowls from its domain. Single specimens are common, and near here there is a long straight line of them by a walk, but I think, good reader, that you would like them best in a large irregular clump.

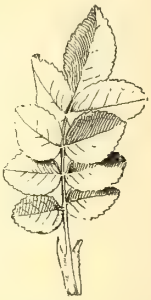


Fig. 10.
[Hybrid with rounded leaflets.]

[*Y. filamentosa* is hardy in the northern states.—Ed.]

Orange Co., Virginia. Arthur Davenport.

ROCKERIES.

A FEW summers ago I watched with much interest the construction of two rockeries in a neighboring garden. The first step taken was to saw off the top of a noble tree that overshadowed the proposed site, leaving only the great trunk with ungainly stumps of branches; these, in time, were peeled of their bark, thus giving the whole thing a wierd, uncanny look. especially on a moonlight night. At the foot of the tree, now shorn of its beauty, a vine was planted, whose supposed duty was to cover up the ruin made by the hand of man. Then the serious work of building began, for which several wagon loads of soil and quarried stone were requisite, as well as the services of a mason. Slowly the walls arose, layer upon layer, until, after many days, they were completed, to the owner's great delight. There they stood, within twenty feet of each other, two wondrous mounds six feet high and five feet in diameter, composed of many ponderous stones, with here and there great yawning pockets, or crevices, for the reception of plants. Surely such rockeries as these would satisfy the most ambitious, and the owner seemed to take much pleasure in them. But, fortunately, they had been built in the rear of the garden where they did not spoil the effect of a nicely kept lawn, which latter fact is worthy of consideration. Many persons imagine rockeries so ornamental that they deserve a most conspicuous place, sometimes even in the midst of a lawn or a garden, where the sun shines fiercest, when, on the contrary, they should be concealed and overshadowed by trees and shrubs. There are rockeries and rockeries, and while some of them merit the ridicule they receive, the fact remains that, for filling an out-of-the-way shady nook of the garden, they are unequalled. But they must be properly managed, not built up like a wall; neither is it necessary that they should be round, as many seem to think. By cutting away part of a mound or hillock of soil, the stones may be piled up against it in such a way that they resemble the cropping-out of a rocky substratum, thus forming a lodgment for wild flowers; and furthermore, the stones of a rockery should never be white-washed, as this not only spoils all their native beauty, but also causes the radiation of heat to such a degree as to prevent the growth of the plants.

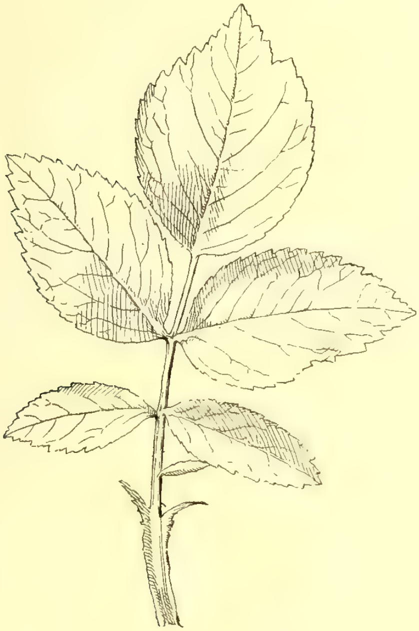


FIG 7. TEA BLOOD. (*See page 665.*)

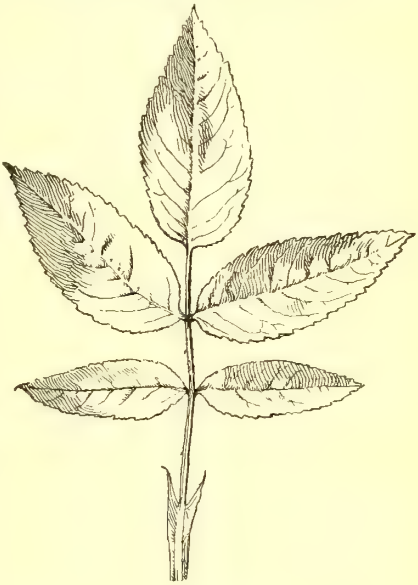


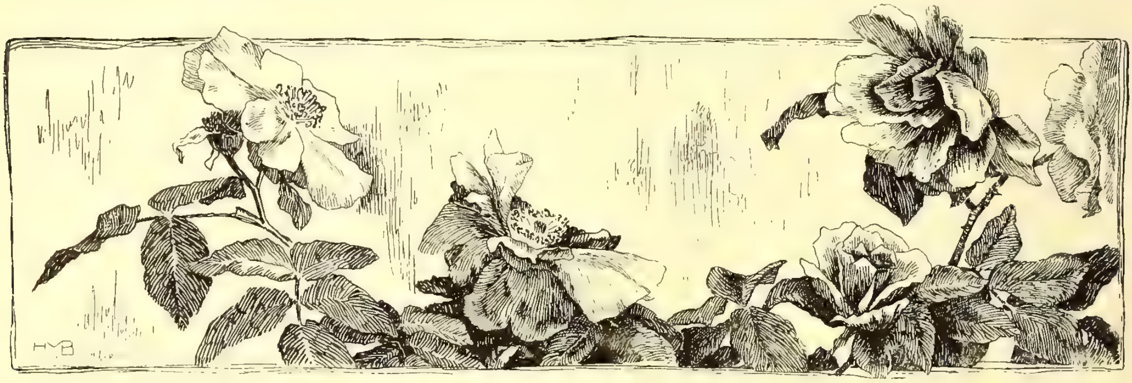
FIG. 8. TEA BLOOD. (*See page 665.*)

A very good way to make a rockery is first to place some heavy stones firmly in position as a foundation, cover them with soil, and then upon the soil pile more stone, pushing them in as irregularly as may be making the whole work look as little like human handiwork as possible. It should appear as though Dame Nature had dropped a bit of the forest in your garden. Then go to the woods for your flowers. No cultivated ones, however pretty, should have a resting place on it. It is a bit of the woods, and should have wood flowers. There are plenty of them—stone crop, Indian pinks, wild geranium, which loves a rockery; the dainty hepatica, and, above all, ferns. When these conditions have all been fulfilled, a rockery is produced that is beautiful in itself, and is in harmony with its surroundings; it will be a constant pleasure.

Bellevue, Pa. MARGARET D. BROWN.

NOTES ON SOUTH CAROLINA HEDGES.

THE finest cedar hedge I have ever seen (in this country or in Europe) is on one of the old plantations. It is not ante-bellum, though, having been planted about twenty years ago. The soil in which it grows is unusually poor, and was prepared as follows: a circular ditch two feet deep and three wide was dug; into this was put dead leaf mould and the displaced soil in alternate layers. In this the little cedars, taken up with a cake of earth, were planted in a double row, and watered regularly for a month or so. During the summer some of the plants died and these were replaced. Twice a year the hedge was carefully clipped, and at the end of ten years had obtained the perfection of its beauty, and "stood dressed in living green." The constant clipping has kept the foliage delicate and prevented it from getting the somber hue of old cedar trees. Most justly does it excite the admiration of all visitors. The sides are not perpendicular, but after reaching the height of four or five feet, slope inwards, so that the flat surface on the top is only a foot wide.



CHEROKEE ROSES.

Alarming signs of decay in certain branches or plants have several times appeared, but generally stimulating liquid manure has proved a cure.

On the same plantation are two other hedges worthy of mention; a "wild orange" (*Laurocerasus Caroliniana*), sometimes called "mock orange," and a gardenia. The former is very old, nearly a century, but it seems as vigorous and healthy as ever, and stands constant trimming. The tree when left to itself is symmetrical, and reaches a height of thirty or forty feet; one blown down by the cyclone of 1886 measured sixty-five feet. It had sprung up in a cluster of oaks, and had to reach up to the sunlight. It had no branches, only a head. The other hedge, the gardenia, or cape jessamine (so called because introduced by Commissary Garden from the Cape of Good Hope) flourishes in those parts of the shrubberies which lie on the edges of the rice fields, where it is valuable as being a handsome ever-green shrub which can stand water. During the spring freshets the family take to the canoes and are paddled between the rows of gardenias, which hedge in a favorite walk, and which will emerge as green as ever from their bath of several weeks duration. Even the smaller plants and cuttings do not object to a submersion which would kill the magnolia and other native plants. The flower resembles a white camellia, and is very fragrant. On a neighboring place are some fine box hedges; the grandmother of the present "oldest inhabitant" could not remember when they were planted. Other favorite hedges are: The cassena (Youpon holly), which is very tough and of compact growth, but does not produce its beautiful berries, or only sparingly, when kept clipped; the euonymus, which grows vigorously and is valuable on account of its fine glossy foliage and berry; the cherokee rose, which must be allowed to follow its own sweet will—most fortunately this is generally in a right direction! The finest growth seems usually attained by allowing it to over run a native growth of underbrush, such as naturally covers the sides of ditches or banks. Though the bloom is very transitory, its exceeding beauty and the grace of its long glossy-leaved branches makes it well worth the caring for.

The pittosporum has fine glossy foliage, sometimes variegated with white, and rather effective, clustered, white flowers, with a rather disagreeable perfume. A hedge of the common fish geranium might be added to the above list, though it is an uncommon one. The plants were nearly five feet high, and bloomed freely. It was under my care for several winters, and stood a low temperature, being partially covered on the coldest nights, but it was killed by an unusually severe "freeze." While it lived, it was a notable and brilliant hedge.

Charleston. C.

CELERY, AND HOW TO GROW IT.

"WELL begun—half done!" Good plants are indispensable to a good beginning. To insure having them just when soil, season and hands are ready, and the weather favorable, they should be grown at home—a task by no means difficult.

To grow the plants, procure good seed from a reliable source. As early in spring as the condition of ground will permit, prepare a smooth, mellow seed bed in any convenient spot, where the soil is rich and reasonably free from weed seeds. Mineral manures make firm, stiff plants; hence wood ashes and phosphatic fertilizers, applied broadcast and thoroughly raked in, are preferable to even the best compost with its probable weed seed supply.

Mark out drills not more than one-half inch deep and not less than ten inches apart, and scatter the seed in them evenly, like sowing carrots. *Do not cover*, but walk over each row, putting the heel of one foot just ahead of the toe of the other, thus stepping upon every inch of row with your full weight, and pressing the seed firmly into the soil. The natural moisture of the ground insures prompt germination under this treatment; and the application of a light mulch of litter, practiced by some, though perhaps beneficial in a few cases, yet, as a rule, proves superfluous. Allow no weeds to grow, and keep the soil well pulverized between the rows *all the time*, loose soil being a perfect mulch. Repeated light dressings of nitrate of soda are of wonderful help. Thin where too thick, leaving about fifty plants to the rod. If tops grow rank, shear them back once or twice to make stocky plants.

I practice sowing a few rows of celery in my vegetable garden at the same time and in the same manner that I sow my early vegetables; and there, all receive the same treatment. The rows are frequently cultivated with either Ruhlman's wheel hoe or Gregory's finger-weeder, and weeded by hand as often as required. Thus I raise a row of celery plants about as cheaply as one of cabbage plants or radishes. The same length of row produces nearly twice as many celery plants as it would cabbage plants; and the former are worth twice as much money.

There are few localities where a limited number of good celery plants would not find ready sale at 50 cents per 100. This pays exceedingly well, and often more than the production of marketable celery. Hence these minute directions.

Growing the crop from good plants is comparatively easy. If not grown at home, I would rather buy them of a skilful grower near by, than risk the uncertainties of long transportation by express.

Between July 1st, perhaps even earlier for very early use, and August 1st (later at the south) the plants are set in rows three or four feet apart for dwarf, four or five feet for tall varieties, and six inches apart in the row. A rich piece of land, just cleared from any early garden crop, is usually in fit condition for celery without manure, except perhaps a dressing of wood ashes and phosphates scattered over the rows and mixed thoroughly with the soil before setting plants. If the soil is not rich enough, a deep furrow may be plowed out for each row, half filled with fine compost and this well mixed with the soil in the bottom of furrow. Coarse strawy stuff is not wanted. Re-fill with soil, leaving a slight depression so as to make the surface of the piece somewhat undulating. Stretch a garden line along the row and set the plants, after shortening tops and tap root and dipping roots in water, in the usual manner, always pressing the soil firmly about the roots. Select for this work a time when the soil is fairly moist—neither wet nor dry. In a dry time set after 4 P. M. and water plants freely after setting.

Now keep the path clean and the surface of the soil open and mellow close up to the plants at all times. The first step toward "blanching" is the "handling." Plow light furrows towards the rows, or draw loose soil up to them with the hoe. Gather all stalks of one plant together; hold them firmly with one hand, and with the other pack enough soil around it to keep the plant permanently in this upright position. More soil is then drawn up with the plow or hoe. For plants to be stored for winter, this "handling" is sufficient; but if intended for fall use, the crop has to undergo the blanching process. With plow and hoe bring the soil between the rows up to the plants, putting the finish on with the spade until only a few inches of the tops are visible. This is done from September to November, or from three to four weeks before the crop is wanted for market or home consumption.

The most popular way of storing for winter is by placing a row close together in narrow trenches, the tops even with surface of ground, and by covering with boards and litter to exclude light, rain and frost. Or the plants may be placed upright upon a layer of moist soil in a dark cellar. Various other methods are practiced in a small way. Never handle while frozen.

The best varieties: The coarseness of the tall kinds has nearly driven them out of general cultivation. The dwarf sorts are good, but I know not one superior to Golden Heart (or Golden Dwarf), with its beautiful rich yellow heart, when blanched. White Plume is a so-called "self-blanching" sort, and, in theory, needs only "handling" without blanching, To bring out its best flavor, however, it requires the laborious "earthing up" or blanching process as much as any other.

New York. T. GREINER.

MORE ABOUT HORTICULTURE FOR WOMEN.

THE subject of horticulture as a business for women has been discussed in a very able manner in so many of the leading periodicals of the day that further detail may seem superfluous. I notice, however, that by far the greater number of articles written on the subject deal only with large enterprises, resulting in great gains in health and wealth, but quite ignore the smaller undertakings and forget to mention certain drawbacks with which women have to contend in this really delightful calling.

In the first place, no woman (or man either) need expect to become a successful gardener unless she has an inborn love of "green things growing." If she can look upon a well-ordered garden without feeling her pulses quicken, if she is wholly indifferent to weeds *versus* vegetables, in short, does not "known beans" when she sees them except on the table, then, I say, she had better turn her attention towards other pursuits, for no garden will ever smile for her.

But if a woman has a genuine liking for this kind of work, possesses business ability and tact, there is no reason why she may not be successful in proportion to the extent of her undertakings.

Physically, few women are able to do the laborious part of garden work There is plenty of back-breaking, back-aching spading, digging and hoeing to be done, for which not one woman in a hundred is fitted, and for which a man must be employed. There is, however, plenty of light work which a woman can do, and there is also the constant personal supervision of the work so essential to success. This alone would keep a woman out of doors and give her health. Lord Bacon tells us that "Gardening is the greatest refreshment to the spirit of man," and why should it not be equally so to tired, nervous women? But they need some incentive other than a mere "constitutional" to keep them out of doors. Obviously, gardening for women pays best in fresh air and sunshine. Something can be done without incurring so much expense that the loss, in case of partial failure, will be burdensome.

If rightly managed, half an acre, or even less ground, can be made to supply vegetables—potatoes excepted—for two or three families with but little more expense than is commonly required to run one ordinary kitchen garden.

No ambitious woman, debarred from more lucrative employment by ill health or other reasons, need feel that she is "not doing anything" if she can supply the family table with fresh vegetables throughout the season, and market enough produce to cover all expenses of the garden; and in most cases which have come under my notice, there has been some profit besides. Right here let me say that this extra gain usually comes by making a specialty of some one thing, as celery, cauliflower, or some crop for which the soil seems especially adapted.

The physical inability of women to do the laborious part of gardening in case of an emergency is a drawback which will undoubtedly always attend her in the calling, and it is one not so easily overcome as their ignorance of the subject. Any profession worthy of the name must be learned, horticulture not excepted. Experience is good, but many times is so expensive a teacher that keen observation, coupled with the ability and disposition to profit by the experiences of others, will be of great advantage to the would-be horticulturist. Ask women thus engaged in gardening, who are dependent upon the day laborer for assistance, to name the greatest difficulty they have to contend with, and I think the majority of them will pass sentence upon the aforesaid day laborer—sometimes the lack of him.

Take the average country town, for example. The gardens are many and the laborers are few, shops, factories, mills, etc., taking every available man. A good gardener always has his hands full. He is wanted in seventeen different gardens at the same time, and seventeen different people insist upon being served first. If he happened to be born without a conscience, he will doubtless pacify them all by promising them to come "the very next day," and if the weather is propitious, some one of the seventeen will probably be made happy, while the other sixteen may sit on their back steps and cultivate patience in their souls, while watching the weeds flourish in their gardens. Therefore, as first-class help is not always to be had, one must take what one can get and be thankful.

The class of men as a rule, who do such work do not like to work for women, unless they are given *carte blanche* of the premises, and can do exactly as they like. In the first place, they have little faith in the ability of women to manage a garden, believing rather that because one woman made an everlasting muss in the garden of old, it follows that her descendents should keep out of gardens altogether. In the second place, they hate to be "bossed by a woman." Cranky old fellows who think what they do not know about gardening is not worth knowing, are apt to get "riled up" if required to depart from ancient methods and follow modern ideas. For such a man to admit that a little woman with her head full of "book farmin'" knows better than he how this or that crop should be managed, is out of the question.

"To stand your ground like a man" says one, "and have your work done as you want it, is simply to pose for a shrew before the public; you will be called a 'hard woman to get along with' the minute your back is turned, and the man will most likely plant everything on a bias and pocket the balance of seeds besides, in revenge." Such extreme cases are the exception, not the rule, and much of the difficulty may be obviated by the exercise of tact. Happy is the woman, in this or any other calling, who possesses that precious gift!

In behalf of the sterner sex allow me to say, that the masculine skull is not so thick or his nature so depraved that he cannot see the tendency of the times in spite of prejudice. The business ability of woman has long been recognized in other callings, and if we read the signs of the day aright, Pat and Joe will soon cease to choose employers according to sex—unless it be to give the preference to the weaker party, as might be properly done.

"Bein' as you're a woman, I thought I'd do your work first and let the other fellows wait," said one son of the soil, as he presented himself promptly on time in the garden of a lady accustomed to promises and long delays.

A blissful day will it be for women when all gardeners feel like this one. There is considerable food for thought, which my lady readers will do well to note, in the answer of a sturdy fellow who was gayly whistling on his way home after a hard day's work in the garden of an energetic woman.

"Well; John, how do you like your new boss?"

"First rate; knows what she wants and how she wants it, and that's more'n half of 'em do!"

Vermont. G. A. Woolson.

GARDEN WORK FOR NOVEMBER.

THIS MONTH closes up the season out of doors. Parsnips, horse-radish, salsify, dandelion are hardy in those situations where water does not remain on the land during the winter months. Spinach, corn salad, kale, in the latitude of Massachusetts, are rather uncertain, yet often remain intact. The best protection is pine boughs brought from the woods and scattered thinly over the crop. They keep it better than anything else, but the labor of applying is considerable, and would be quite expensive over a large area. Perfect heads of cabbage buried in pits keep well; for imperfect heads, those not quite hard, pull them up with the dirt on, and set at once close together in a trench four feet wide, just below the surface of the ground; cover with leaves from the woods, and later, lightly with earth. These will be hard heads in the spring. Last winter I wintered several hundred successfully. They should be used at once when uncovered.

Brussels sprouts, cauliflower, endive, kohl rabi and celeriac will keep for a time in a winter house. Dandelion and rhubarb roots for forcing should be kept cold after digging till the time when they are wanted. I consider fall as good a time to set rhubarb roots for a new plantation as any. Cut the roots in pieces having one or two large eyes each, and set in holes dug at the required distance, which is usually four feet apart each way. Cover the rhubarb crowns with manure; also asparagus, after burning the old stalks. Bring bean poles under cover, if possible; set them on and around a central support if nothing better can be done.

Leeks will keep well in the winter house, and if banked up with the stalks will sometimes winter out of doors. Green scullion onions will sometimes winter successfully in the same way on the spot where they grew. The Egyptian onion is sure to live and make an early growth in spring. Endive, lifted with the dirt on the roots, will keep two months in a cellar. Spinach and kale, cut and brought into the cellar, will keep quite well for two or three weeks. Celery cannot be left in the field after November 10th with safety. If not bleached, bring it into winter quarters on some dry day when the ground is not frozen, if possible. I saw 300 roots kept till April, in fairly good condition, near a hatch-way in an unheated cellar that was opened daily all winter. The celery was set against the wall, and the earth in which it grew was drawn half way up the stalks. With us, all roots left in the ground after November 1st are in danger of freezing in, yet they often remain out up to the 20th. Squash with a hard shell will keep better than those without, and should be used last.

Applying manure in fall is now considered a wise thing to do if the ground is level.

Lettuce not yet half grown may be carefully lifted, set under glass over hot manure, and fairly good but not perfect heads will be formed. These will furnish lettuce in advance of the plants now newly set from seedlings. Also plant seed under glass in the greenhouse or hot bed for plants which are to be set in the beds in February. Lettuce is half hardy, but heat and glass are needed now to help it forward to perfection and attain satisfactory results. The beds, which should be carefully watched, will need mats and shutters over them at night for proper protection. Cress is fit to furnish cuttings and parsley is well started.

At this time of the year the outside and inside temperatures at night will vary about 10°, so if there is danger that the mercury will fall at night to 20°, it is best to start a fire. Water and ventilation are little needed.

W. H. Bull.

Hampden Co., Mass.

NOTES FROM A WOMAN'S GARDEN.

NOVEMBER.

DURING some of the warm, pleasant days that always come in November we should put our garden in perfect winter order; for our garden even in the coldest days is a well-beloved spot. It is here, when the ground is bare, that we often take our daily walks. We have even gone so far as to dig, or have dug paths through really deep snow; and walking in these paths under the apple trees with the chickadees chirping merrily, if the sun shines and it is not too cold, we can almost forget that winter is upon us and spring gardening very far away.

The grape vines should be well trimmed and firmly fastened to supports by bits of leather or strong string. Prune the currant bushes and save cuttings, tying them in compact bundles. Use red cord for the red variety, and white cord for the other. Place them with cut ends down in a pit two feet in depth, and about the same in circumference. A good way to mark the place where the cuttings are buried is to put in long, slender stakes on opposite sides of the hole. Then fill up carefully with earth, pressing it down, and cover all with a layer of leaves at least a foot in depth. The leaves may be kept from blowing away by placing some heavy material upon them. Cuttings thus treated are fresh and green, often rooted, when unearthed in the spring.

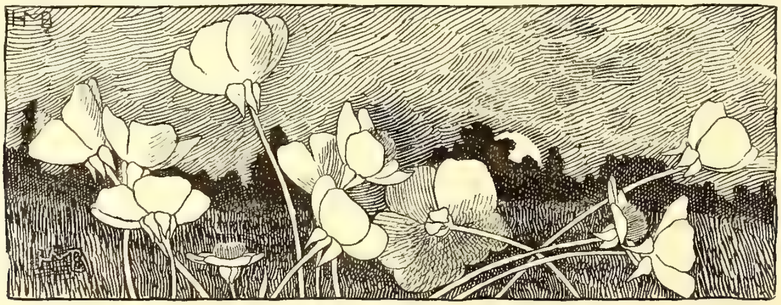
Raspberry and blackberry canes should be tied firmly to their stakes, and they, as well as the currant bushes, should be well banked up with some fertilizing material, if possible. Rose bushes should receive the same attention.

Strawberries, as well as all bulbous plants that remain out of doors in the winter, are especially benefitted by a generous application of stable manure when applied at this season of the year. If this cannot be obtained, pine needles, straw, or any similar dressing should be applied. It should be quite free from seeds, else a heavy crop of weeds will put in an appearance in the spring.

October and November are the best months for "housecleaning" out of doors, and if the work is not well done our gardens will be anything but a pleasant sight during the winter and early spring. Of course every good gardener has a compost heap, and upon this put the corn stubbles, cabbage stalks, and any such material that has been left in the garden. Next year we may want some soil for potting plants, or for some particular flower bed, and it is well to prepare for that time now. But beware of saving anything that will spread weeds. Clean out the fence corner, and burn everything that may contain their seeds. Take advantage of every opportunity of destroying these pests, whatever be the season of the year. The easiest way of getting rid of the canes of the raspberries, blackberries, and the brush from the orchard, is to burn them also.

When all this has been well done the work for the year will be about ended, and plans for the following season's operations will be in order.

Plymouth Co., Mass. M. E. Vigneron.



TARRYTOWN LETTERS—XIII.

BY A. B. TARRYER.

IT MUST have been some time last August that Mrs. Tarryer decided that there were no grass gardens conducted on legitimate principles, and resolved to make a show of hers. She took full counsel with Lady Schnipticket, Parson Camperdown, and M'Tavish came into the scheme when the trouble with the Parson's lawn blew over.

Lady Schnipticket pushed the affair with her whole soul and bank account. She staid at home from no end of summer resorts, opened all the cool springs she could hear of for miles around, and provided big jars and stands of cut-glass tumblers for them.

As usual with such local affairs, invitations were sent to the Empress of India, all the crowned heads of Europe, the President of the United States, heads of departments, farm colleges, state boards of Agriculture, education and health, directors of experiment stations, editors of newspapers, governors of states, *et cetera*.

This was right in the stickiest time for postage stamps with bogus gum on them, when a cat, after a nap among the official papers in our Managing Committee Room, had to be steamed to detach the stamps from her fur.

"None of these great people will come," Lady Schnipticket said, "but this is the easiest way to wake up and ring in our neighbors, who will presently be cordially invited. For our own safety—let alone comfort—we need to put a stop to fooling with grass in this vicinity by a better knowledge of it."

Betwixt the heads of this concern a select list of under-botanists, gardeners, alert clericals, mechanics and a few newspaper men (all hard-worked fellows) was made out, who Lady Schnipticket said "*must* come, if free passes, expenses and cash for substitutes would fetch them." She knew everybody, and remembered to good purpose her husband's way of fixing legislative committees.

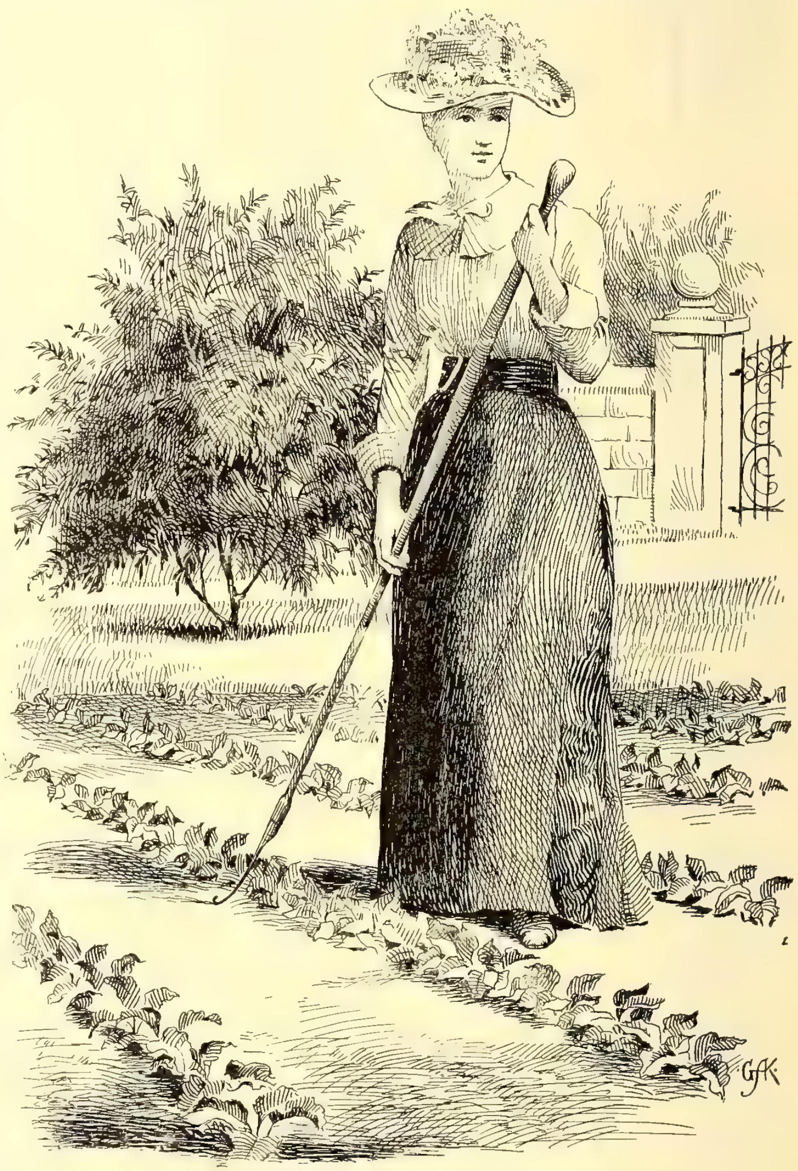
Our house was jammed full of the happiest busy people I ever saw together. Some of Mrs. Tarryer's graduates were called back for the occasion. A number of efficient spinster and widow ladies ("what the Colonel would have called 'our reserves,'" Lady Schnipticket said, and what M'Tavish did call "forty old-maid power") were enlisted. The repressed energy spent upon this enterprise was immense, and multiplied enormously by its exercise.

The "grass" part of Mrs. Tarryer's garden covers something more than an acre, but the adjacent tillage and "campus" lands, for her always large family, are much more extensive, so that the prospective scene of operations could scarcely be over-crowded by any number of well behaved people. The population of the whole earth might be buried in one of our smallest states, they say, without making the soil any too rich for skillful gardening purposes.

Two guests came to this show who were not invited, except in spirit. These were "Uncle Sam" and "Brother Jonathan." To make room for them I had to vacate my favorite quarters, a shaded ell of the house, formerly a large kitchen when our family was larger, with a big fire-place, an outside chimney and an upstairs room or two communicating with the capacious garret of the whole house. In effect, here was a museum of our left-over arts and sciences—books, implements, tools and utensils of our former lives and industries, and what is most rare in these days of museums, the ancient things were not a mouldy or rusty old lot, but in good order—bright, usable, handy and home-like. You would wish to be basting a joint or a fowl on that polished spit; the poker looked fit to temper a mug of flip, and the toaster invited slices of bread. The old gentlemen came early in these proceedings, and staid a good while, but to tell how they spent their time and enjoyed themselves nights and Sundays would be too much for this letter. During this preliminary business I never thought of anything strange, but now I am convinced that not everybody saw these old characters as plain I did. While the boys and girls were weeding, trimming and giving everything in the garden its best looks for the great day, Brother Jonathan in his tights and Uncle Sam in his seersucker trowsers were constantly mixing in with what was going on, and I supposed everybody saw them. As for Mrs. Tarryer and Lady Schnipticket—but who knows what women see or don't see?

Those old fellows did a great deal of writing and over-hauling of books, ancient and modern, and they were always whittling something while they talked. Whether in their snuggery at night, where they had the shaving horse and rived timber, or whether out of doors somewhere, they always *made* something by their labor or play. Look at those handles for all sorts of purposes left behind them in proof of this. Nearly every fence-post and top-rail around the garden that was fit to whittle shows the marks of their jack-knives. You wouldn't think Uncle Sam was a sculptor, but look at the pair of woman's legs, modestly crossed, cut as natural as life in the top of those bar-posts, and judge for yourself. They are wonderful specimens of mediæval art. And if any State Pomologist will explain why Brother Jonathan—in this scarce year for apples—should lodge a neat cider-tap in so many of those post-holes, I should like to have him !

The date of the show was first talked of for the first goodness of the moon in September, but for the sake of displaying the weird effects of artificial lights on the fine fabrics of the grass garden in the early evening, it was judged best to have the moon rise on them a little later. By this time the Associated Press had hold of the affair and was working its wires out of love to "grass," or news, and ready to move at a wink from either Mrs. Tarryer or Lady Schnipticket. The show must be at its best, whatever the convenience of the public might be. That could take its chances.



One of Mrs. Tarryer's Girls with a Weeding Thimble.

As the time drew near, M'Tavish was in his glory. He is a great manager (with a woman to tell him what to do). I'll say that for him ! There were horses and carriages to buy or hire, and teams to match and train for the procession ; gangs of carpenters and decorators to engage and control. A company of electric and other fire-workers were to arrive by the last train. Mrs. Tarryer and Lady Schnipticket both declared they wouldn't have the fire-skeletons and scaffolding around by daylight, and some said there was a regiment of trained balloon builders camped in the woods near-by for a week. By an ingenious arrangement of wires, an electric sun was suspended directly over the center of the grass garden. All things were done, as we read of, without the stroke of a hammer, and Mrs.

Tarryer says Lady Schnipticket showed her the stubs of sixteen checks in one day, all drawn in favor of Scotchmen!

Should the weather prove hot, as was hoped, on account of the late use of muslin dresses in a garden party, the grass plats would not be shady enough for all the performances. "There are plenty of fine plumy trees, M'Tavish, which you can thin out of my planted coppices," said Lady Schnip. Three hundred was the tally cut and stuck in the ground between two days, fit to stand a gale of wind, by a gang of Scotch telegraph-pole operators.

What tickled Uncle Sam and Brother Jonathan was that the party wasn't named till almost the last minute. The name had to grow, as it were. Mrs. Tarryer generally manages to have a cart-load or two of melons under the well-arbor to quench the thirst of dog-days, and this year the boys made big calculations and had a large piece planted (manure plowed in), and the melons were appling so thick you could step from one to another. But though they were large, they were later than usual, and it was not known to a certainty whether the bill for melons and moonlight would be full together in September. M'Tavish couldn't tell a ripe melon without plugging it, but he was wise enough not to try. So the date of the show was set only when, from actual inspection by the two veterans and the leading ladies, it was seen, looking at the quirls, scratching the bellies of some, considering the luxuriance of the vines and the state of the weather, that we could certainly pick twenty cart-loads of fine melons at the end of a week. Then it was decided to call the affair "A Late Watermelon Party." Up to this time our newspaper friends, who were working the thing up, had mentioned it in terms that might mean anything glorious, but now they had full swing to enlarge upon melons. From private advices concerning the health of a certain eminent official, it was hoped this name would fetch him, but it didn't. He never knew what was good for himself.

Your pages need not be loaded with details, for which the daily press is better fitted. Suffice to say, that the day was splendid—just right in the grass-garden for artificial shade-trees which looked as if they had grown there, and capital, in the grove close by, for the melons and the long tables loaded with flowers and the excellent lunches people brought with them. There were several hundred seats for pairs provided about the grounds, and the truth of history compels me to state that Mrs. Tarryer undertook to teach the Scotchman how to eat neatly with spoon and fork, from his half of a big melon, on one of them! She estimates (all flesh is grass) that fifty or sixty safe matches will be made by her "Late Melon Party." But these are only social matters.

From a scientific point of view the gains were large. Nothing tedious was on the program; everything was spectacular and enlivening. Between the intervals of band-playing from the grand stand, several short papers were read. Miss Laura Schnipticket, a bright young woman of great expectations, at home on her vacation from a medical college, gave an essay "On Certain Glaucous Appearances in *Poa trivialis*," which was heard with rapt attention by the younger *savans*.

Some three hundred and fifty select young people, who had learned their parts well, were seated under the shade trees among the grass plats, so that every considerable plat had several people to speak for it. Mrs. Tarryer managed this part of the show herself. A look from her silenced the brass, after a bar or two of "God Save the Queen." She then stated to a hushed audience (I remember hearing a cricket chirp), that through the clumsiness, inefficiency or the craft of teachers, the common people, including nearly everybody, were only learning the nicknames of grass, and she thought it high time we did better than that. Eminent agricultural botanists write of "the well-nigh impossible task of separating *Agrostis* into its varieties." (Here came groans of derision from all parts of the garden.) "What do you say?" asked the speaker. "Here are thirty of us distinct varieties of *Agrostis* without any names," came back in a roar from the grass-plats.

"Of the *Festuca* tribes, but little more can be said for the schools," Mrs. Tarryer went on. "What does my garden say?"

"Here are twenty more of us beautiful grasses under your noses these thousand years wanting names!" came back in strong young voices which thrilled the audience.

"Now let *Festuca ovina* rise and speak for herself," when about half an acre of young people began to swing their hats and handkerchiefs from the garden, exclaiming in unison: "We are all as different as can be, full of business, and we want names to carry it on!"

Upon call, *Agrostis vulgaris*—saucier than *Festuca*—and several other species were put through the same performance, with even more vehemence and *aplomb*. This part of the show was singularly effective, because the entire audience of more than fifteen hundred people, including our first citizens, were sitting high up where they could see, plain as a pike-staff, that the scores of plats represented, flat as Turkish rugs on the ground, and more lovely, were strikingly unlike each other. The success was immense and the applause deafening.

"Now," said Mrs. Tarryer, smiling benignantly, "it scarcely need be pointed out to you, that although it may once have been considered good botany and even business—of a doubtful sort—to neglect these most interesting and valuable varieties of perennial forage, it cannot be so any longer. No man—whatever his station—can afford to take agricultural money and shirk the duty or labor of providing these distinct and fixed types of grasses with names fit to pass current everywhere. It would be rank infidelity to the foundation arts of husbandry and the best interests of society to leave our enormous grass industries—in lack of exact names—a prey to quacks and charlatans any longer! *You*, young men," the speaker said with emphasis, "should see to this matter at once."

Right here was a change: Mrs. Tarryer sat down, and the reporters will have it that M'Tavish began to speak, but I vow it was Uncle Sam, though I admit that M'Tavish wore that day one of the late Col. Schnipticket's blue swallow-tail coats with brass buttons, which he filled remarkably well, and did bear some faint resemblance to U. S. But do take notice of what he said; the flask of apple brandy—cool process—he had in his pocket in the morning will not explain all of it:

"Friends and feller citizens! I'm right glad to be with you here! We've sarched these states through without finding a garding before reely fit for a woman to go into, and here we see she owes that perfection to herself! Brother Jonathan and me hev just returned from a tower among the spearmint stations, as you call 'em, and I tell you, they are weedy! Not one farmer in five thousand—bar'in genelmen present who can see what is before 'em—know what it is to make land clean enough for a crop of flax! Gar'ners are wus, and ig'nant capital is holdin' land for a rise, growin' weeds instid o' grass. This has gone on till the lads of your stations think weediness is manly and fashnab'l. I wish you to understand, friends, that idee never did and never will tallow! Brother Jonathan and me want word to go out as soon as next Christmas when, as a matter of course, we shall all mean well by posterity—that next summer, after fly-time, if any sign of weediness is found around any spearmint station, that everything of the male sect, approaching or past the age of puberty at said station, shall be sterilized! We must have better public examples anyhow! For my part, I ———."

Here the band struck up "Hail to the Chief" with vigor, and I lost sight of Uncle Sam, or M'Tavish, whichever it was, 'till the people were scattered about the garden, when the latter appeared in fine feather, with a large following of farmers, gardeners and practical men; he explaining the different plats of grass with great volubility; and they say now he is going to run for Congress. Down under the seats of the grand-stand I picked up an armful of experiment station reports, with leaves turned down at "Botanical Division," "Experiments with Grass," "Plat Tests," etc., and passages marked, which showed that somebody had observed the prevalence of weeds and the mortality among grasses at those seats of learning, and was going for them with a rush.

Brass bands are good things for regulating uncertainties in public meetings—don't forget it! Our show passed off charmingly. Mrs. Tarryer is still receiving letters full of grief from eminent men who couldn't be there. Several children have already been baptized Ovina, Trivialis, Glyceria, Holcus and the like mellifluous names, on account of her "Late Melon Party," and besides, quite accidentally as it were, there has been a wonderful increase of industry and intelligence in regard to weediness and grass culture. There is nothing like indirect teaching and object-lessons for educating the masses.

P. S. from Mrs. Tarryer:—

"DEAR MR. EDITOR: Dr. Tarryer is usually *very correct*, but he is an artist *by his impressions*, and the day he wrote this letter he was suffering from a return of "*la Grippe*" and *heavy doses of quinine*, so that, although the *tout ensemble* of his work is excellent, as far as it goes, some of the details are *exaggerated* and *might* be misunderstood. Everybody *hereabouts* knows that *our house is as open as* "*Pigs in Clover*," and all that cared to know, knew that Messrs. Camperdown and M'Tavish *were in training* for the parts *mentioned*. The latter gentleman had a good deal on his mind, *of course*, and is liable to get excited, but Mrs. M'Tavish had secured the flask referred to, *and dropped it through the platform and broke it previous* to her husband's *speaking*. We found the music *useful*, *certainly*. M'Tavish has *all the zeal of a recent convert* and *no patience* with the work of the stations. We feared, *if he was allowed to go on much further*, he might *say something* that would not be *pleasant* for the friends with us connected with those *admirable* but *slow maturing* institutions. Mr. Camperdown's remarks, in the character of Brother Jonathan, were *much more agreeable*. Several of the young gardeners, scientists and clergymen called attention to *the ex-*

quisite appearance of the many varieties of *turf*, *in pure cultures*, but what they said was fully reported in the journals of the day.

"*September* was a *hard month for shows*, but we were very fortunate in the weather. The expense and trouble we were at were *justified in the end* by the rapid changes in our neighbors' opinions, and *need not be repeated* as grass gardens become *plenty*.

"Yours truly,
"Mrs. Dr. A. B. Tarryer"

[We also have a sharp letter from Mrs. Tarryer taking us to task for omitting from the last issue a picture of a pensive young woman in the act of using one of her improved weeding thimbles. We have hesitated somewhat lest the heads of some of our young gardeners might be turned, and they should start for Tarrytown forthwith. But the following day we received a confidential letter from Dr. Tarryer, urging us to use the picture for domestic reasons of his own, and we have complied. Dr. Tarryer also gives us the following advice: "Save all your misfit canes and spent parasol and umbrella handles! Mrs. Tarryer puts her weeding thimbles on the small end of them, with the greatest success, in any weeding or thinning of seedlings. Knock off the ferule, fit a loop of old watch spring to the tip, and drive the ferule on to hold it. Beats all!"—Ed.]

HESTER'S EXPERIMENT.

I WILL tell you frankly at the very outset that Hester was neither very young nor very handsome. A goodly number of summers, to say nothing of winters, had passed over her head. She had reached the age when life had begun to lose some of its illusions, and when, "somehow, things do not seem as funny as they used to."

Again, Hester's experiment was not one to make money. She was not trying to earn her own living, and she did not catch even a glimpse of any royal road to such a goal. But the experiment was a bold strike, if not for liberty, at least for a new interest in life; for a means of relief from low spirits and a state both of mind and body rapidly getting to the point where even a smaller thing than the grasshopper was becoming a burden.

Hester always had an ache or a pain somewhere. She really was not very robust, and the life of indolent ease that she led, continually cared for and coddled by a most devoted family, was gradually reducing her to such an inert condition that days, weeks, and even years, spent on a sofa would be the natural result, ending in confirmed invalidism.

But she had the remains of a very strong will, and possessed a great love of nature, so a few wise words gave her an impetus in the right direction. She determined to make this experiment, and to persevere in it, even to the bitter end; but she fondly hoped for a pleasant one. There had always been a flower garden attached to the place (said place contained about an acre), and the poor garden had passed from one to another of the family, as this or that one felt inclined to the work. One year it was Mary's, and it was "a sight!"—the weeds higher and thicker than any of the poor struggling plants. Another year Lucy took it in hand and worked in it with might and main, and a few prim flower beds appeared, with a meagre supply of delicate flowers. Each plant was carefully staked, set out just so, and never allowed to bend either to the right or to the left.

For a few years it was "mother's garden," and the little plot truly blossomed like the rose. She was a true lover of flowers, but the required labor was too hard for the dear old lady, and, as she said, "When one has to put on spectacles to plant seeds, it is about time to stop." Then for a long time the poor garden spot remained sunk in a state of "innocuous desuetude," only a few old-fashioned perennials appearing courageously each spring. Hester had this bit of land in her "mind's eye," and also a much larger piece, about a sixth of an acre, stretching away below the pear orchard. When she decided to start on her new venture, this larger piece was in clover, but she could remember it as being, in her childhood, a fine kitchen-garden. But her father's increasing business had led to its abandonment for that purpose, and the family depended for its vegetable diet on the village markets.

Hester resolved to institute a new order of things, and to prove to herself, as well as to the others, that there was nothing like the products of one's own vine and fig tree. She sent far and wide for agricultural books and papers, and for catalogues of every known plant. After imbibing a great amount of book farming, and feeling quite qualified to undertake the job, she broached the subject to the assembled family. Long, loud, and great was the outcry that arose, but in the end Hester had her own way (she usually did, we observe in passing) and her experiment soon began, in spite of the many ill-omened remarks of friends and neighbors—"You will kill yourself," "You will be perfectly stiff with rhumatiz," etc., etc. But her father said: "Let the child try it; it may do her more good than harm, and I think I shall be able to foot the bills."

So Hester engaged a spry young-appearing septuagenarian, and although he had only one seeing eye and was rather deaf and a little stiff in the joints, he was very good to work, and very glad of the modest stipend for this labor, which formed almost his only means of support.

Operations began early in the spring. The land received a good dressing, and then it was thoroughly plowed. This last work was done by the combined efforts of two men, two horses, and a heavy plow. Hester, carefully wrapped up, sat on a chair under a tree and conveyed her orders to the men to plow very deep, by means of her trusty henchman She had mildly begged for a sub-soil plow, but that was an unheard-of innovation, so she had let this pass.

Peas were planted the first week in April and gave a fine "mess" June 17. Those planted a little later did their share towards the regulation Fourth of July dinner of New England—roast lamb and green peas.

A little cold frame gave radishes and lettuce an early start. The planting of corn, beans, squashes, melons, and many other kinds of seeds followed in due succession. The 24th of May was selected for planting lima beans, and the 20th of June saw the last planting of sweet corn.

It is needless to say that during the first year many experiments were tried, and many strange and curious plants and seeds introduced into the garden; but with failures and successes came much practical knowledge, and the whole place took on an aspect of new life. The pear and apple trees were scraped and pruned, the grape vines also; the currant and gooseberry bushes were reset; the blackberry and raspberry canes received proper treatment; a large strawberry bed was set out; even the flower garden was attended to. The man worked early and late, and tried faithfully to obey each order; but you may ask, "What was Hester doing?" Well, she was helping, and every day grew stronger and better able to do the share of work she had taken upon herself. She visited the garden many times each day, and looked after the old man. She weeded here and there, where he said there was not room for his bog-trotter feet. She planted the more delicate seeds and transplanted many plants After a time she found herself able to work, at least stay out in the garden, for several hours each day. She watched with ever increasing interest the growth of everything in her garden. She gathered all the strawberries, gooseberries, and raspberries with her own hands. She provided the vegetables for each day's dinner. Who so proud as she of the delicious lima beans, though her father did say he guessed they cost *him* about three cents apiece! This interest continued the entire season, from first planting to final harvesting. I do not mean to say that there were no disappointments; there were many. Moth and rust *did* corrupt, and thieves break through and steal even the cherished first fruits of tree, vine, and strawberry bed.

Late frosts touched early beans; insects of all kinds encamped round about the devoted garden; cats and dogs unnumbered chose it for their stamping ground; an occasional breachy cow or even active horse wandered therein; and the omnipresent neighbor's hens scratched as though they had sure expectations of reaching China, which appeared to be a greatly longed-for haven. The ancient one was over-fond of twisting between finger and thumb an unoffending plant, saying "This thing is dead," and finding it, as it broke, green and well alive. When his single ocular was not focussed just right, many a little seedling fell under his too vigorous hoe.

But take it all in all, Hester's experiment did succeed, and is succeeding yet, after five years' trial. Even in the winter, gardening has its interests; seeds must be sorted and labeled for spring, and new ones bought; the ever increasing crop of catalogues must be consulted; a new division of the garden planned, so that the same vegetable will not be grown in the same place twice. The squash and pumpkin pies, the beans and corn, the many preserves, remind Hester often of her dear garden.

Last year she felt so strong and well that rising at six o'clock to pick strawberries for breakfast was a delight. The expense of this experiment has not been great, and she often feels that if it were necessary, she could make some money by it after all, for there is often much garden produce to give away. Once she did sell two pecks of fine beans to a passing market gardener who admired them; then she *was* proud! I trust that this true account of Hester's experiment will prove of help and inspiration to other women in similar circumstances. At least give it a trial; you will never regret it. Feel sure that it will prove of benefit to you in many ways, open to you a new avenue of pleasure, and reveal some of the manifold works of Nature, and the provisions of Nature for the restoration of health.

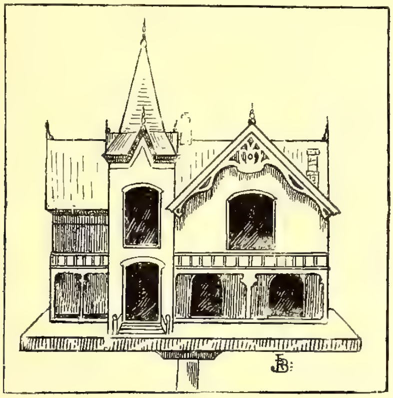
L. R.

BIRDS IN THE GARDEN.

PROTECT THE BIRDS—DO ENGLISH SPARROWS DRIVE AWAY NATIVE BIRDS—SPARROWS AND SPARROW LAWS.

THE immense good our birds do in orchards, gardens and fields is more and more apparent, but only too slowly do people come to the conclusion that they need to be protected. In many districts they are much rarer than they were 15 and 20 years ago, a result of their continual persecution. Nest robbing by the well-known "small boy," destruction of the migrants by light houses and electric lights in our large towns and cities, the wholesale slaughter by pot-hunters, diminish their numbers constantly. Birds alone are able to fight the innumerable army of insect pests.

The unintelligent observer sees when the Baltimore oriole, robin, cat-bird and cedar bird take some of his cherries and other fruits, but he does not see so soon the damage done by noxious insects, nor the numbers which the birds consume. In the height of the season when the eggs are hatched, the birds are working almost entirely for the benefit of the horticulturist and farmer, as the young are almost exclusively fed on insects. It has been found that a young bird in the nest requires a daily supply of animal food equivalent to considerably more than its own weight.


A Bird House.

Instruct your children earnestly to love the birds. Our schools should do more in this direction. Almost every state has certain bird laws. Take care that these laws are strictly obeyed. Do not allow cats to roam in gardens and fields. A cat accustomed to catch birds rarely catches mice in the seasons when birds are easily obtained. Erect bird houses in orchard and ornamental trees. Some of our most useful birds, such as blue-birds, titmice, wrens, martins and great-crested fly-catchers breed in holes of trees and stumps, and suitable bird boxes are always welcomed by them.

An orchard or garden is desolate and dead without birds. They give the fields life and make them doubly attractive. They are the true poets of the gardens and woods, from early dawn until the evening twilight fades.

There are several birds which can not be welcomed with equal delight. Have you ever noticed that saucy foreigner, the European or English sparrow? He is the anarchist of the feathered tribe, who drives away our beautiful and beneficial native birds. Where these birds are getting common the blue-birds and many others depart. The shrike or butcher-bird is a murderer, and should not be allowed to enter our premises.

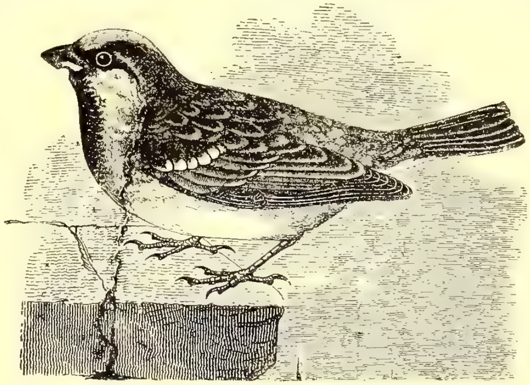
Our most beneficial garden birds are the following: robin, catbird, thrasher, mocking-bird, blue-bird, titmouse, wrens, swallows, Baltimore oriole, orchard oriole, king-bird, phœbe-bird, chipping sparrow or hair-bird, song sparrow, cedar-bird, summer yellow-bird and vireos. During migration many other small birds, especially warbles, thrushes, and finches visit our gardens and are beneficial, as well as entertaining in song and beautiful in their flitting about.—Observer.

DO ENGLISH SPARROWS DRIVE OFF OTHER BIRDS?

Does the English sparrow drive off other birds? I answer, No! All birds have their dislikes, and often rob and chase each other, but do not drive the weaker away. In an old limb of an apple tree a blue-bird has nested for six years. Frequent fights occur between them and the sparrows. Still I see that they are nesting in the same place this year. What has become of our birds is not so difficult a problem as to convict the sparrows of the deed. In the last twenty-five years there has been a great demand for birds of plumage to adorn hats and dresses, and tens of thousands have been slaughtered for this purpose. Pot-hunters and so-called sportsmen have indiscriminately destroyed the birds, simply to have something to shoot at. Every boy is armored up with shot-gun, target-gun, air-gun and devil-sling, and no respect is paid to birds or law. Thus the birds are slain, and not chased away by the sparrow. Were the laws strictly enforced against the sportsman and the boy, all our old birds would return, and would work quietly together for our good.—Indiana.

SPARROWS AND SPARROW LAWS.

There are few observers who will agree with our correspondent from Indiana. It appears to be an established fact that the English or house sparrow drives off our best native birds. This fact is set forth with some fullness by C. B. Cook, in Bulletin 62 of the Michigan Experiment Station, just issued. Mr. Cook declares that "Without question the English sparrow protects more insects than he destroys, by driving away insectivorous birds. That these foreigners drive away familiar native species there can be no doubt. Particularly do the wrens, martins, swallows and blue-birds suffer, as their nesting places are eagerly sought for and secured by the sparrows. Occasionally the native birds hold their own for a time, but sooner or later they must succumb. Often, when necessary, the English sparrows will club together to drive away a pair of native birds. Even the robins and the pigeons cannot withstand numbers, and are obliged to vacate, leaving their eggs and young


English Sparrow.

to be thrown out of the nests and killed. If this were the worst of their attacks, we could still find some excuse for the sparrow; but they have been repeatedly found in the act of destroying, not only the nests, but the eggs and young birds of other species, with no other purpose than to exclude them from the neighborhood. True, the English sparrow has been seen living on friendly terms with native birds, and even nesting side by side with them, but as the sparrows increase in numbers, they become more quarrelsome. As yet, the greatest amount of injury is done around cities and towns, but as the sparrows increase and migrate into the country, they are sure to take with them the same distructive habits and ugly disposition. There are people in America to-day who are staunch friends of the sparrows, but usually such people live in a locality where the sparrows have not yet become a pest."

Michigan has a law which offers a bounty for sparrows' heads, but Mr. Cook shows that this law is of doubtful utility, if not of positive mischief. Many of the town clerks, who receive the heads, cannot distinguish the English sparrow from several other native birds. "As a result, a great many birds that have been sent in for a bounty are our most beneficial birds. Thus many heads have been sent to this station on which bounty was claimed, of such valuable birds as the song sparrow, red-polled linnet and evening grosbeak; birds that our laws protect by a fine of five dollars against their slaughter. We have a good law against destroying native birds, and every person presenting such a bird to the town clerk's office should pay the penalty, which is a fine of five dollars."

An important point in the designation of these birds is the fact that there is no bright red or crimson on the top of the head of an English sparrow. This subject is so important that Mr. Cook's full description of the pestiferous sparrow is transcribed:

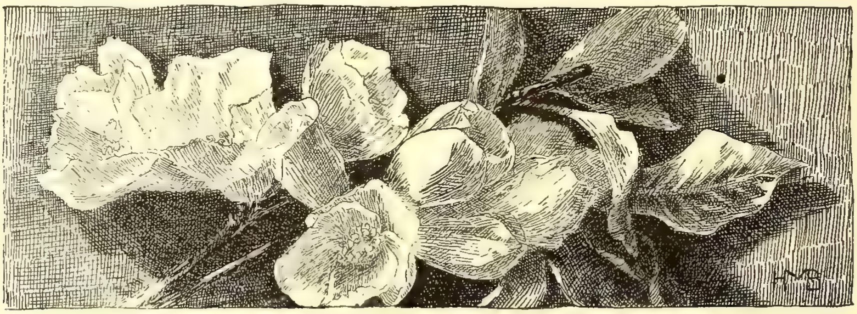
"The bill is very stout, with its upper and lower lines curved. In the male the upper parts are ashy gray, while the middle of the back is streaked with bay and black. The lesser wing coverts—the short feathers at the base of the wings—are chestnut. The greater wing coverts are mostly black, though each black feather is bordered with chestnut. At the base of the large wing coverts is a white wing bar nearly an inch long. The lower parts are ashy white, with the throat black, the latter bordered on either side by lead-color, which extends to the eye. A conspicuous reddish brown stripe extends backward from the eye, separating the gray of the top of the head from that of the cheek. This broadens as it runs back, so that at the base of the neck it forms a dorsal band which extends well down towards the back of the throat, between it and which the gray color is very light—nearly white. In some cases the reddish brown does not meet above at the base of the neck.

"The coloration of the female is less definite. The head is brownish gray, becoming lighter on the throat. The back is marked much as in the male, with the chestnut varying to a yellowish brown. The breast varies from an ashy to a yellowish or dirty white. The young male is like the female. The length of both sexes—from the tip of the bill to the tip of the tail—varies from six to seven inches.

"*Head of Males.*—The bill is always robust and black. The crown—very top of the head—is ash colored. The throat is black, bordered on either side by ashy white; the cheeks also are ashy white. The region between the eyes and bill is black; a white line separates the black in front of the eyes from the ashy gray of the crown; above, and extending back of the eye, is a reddish brown stripe, which reaches nearly to the shoulder.

"*Head of Female.*—In the female the bill is slightly more slender, the color yellowish gray; the crown of the head always solid brownish gray, one color only, which point distinguishes it from the native sparrows of Michigan. The throat varies, but is usually ashy or grayish white."

This is the first Experiment Station Bulletin to deal with the English sparrow, and its advice should be heeded. The sparrow is a dangerous enemy, and every man's hand should be against it. But every man should be able to identify it. The accompanying illustration (on page 679) will aid in distinguishing the bird.



The Editor's Outlook.

TANGLED GARDENS.

IT IS a singular fact that the gardens which the poets oftenest praise are those in which no rule of landscape gardening and no method have been consciously employed. A rhapsody of one of our great parks would be an anomaly in literature, but a lyric of an old and tangled garden is the most natural and common of emotions; nor does it matter if the garden is small and cramped and poor, if only

> " * * here and there some sprigs of mournful mint,
> Of nightshade or valerian, grace the wall,"

so long as the plants grow carelessly and naturally, it possesses charm. If this experience were analyzed we should find that the charm of these old gardens comes from the plants themselves rather than from mere arrangement, from the love of green things growing, so long as they grow as nature intended that they should. The moment we begin to shear and trim and "design," we turn the attention from plants to artifice: the garden from thence loses its charm as a bit of nature. In the old gardens which we knew as children, there was a satisfying influence of which even the memory brings peace and contentment; but in the parks there is only the unsatisfied desire to see something more, the curiosity to seek for new wonders, and then the fatigue which comes from sight-seeing. We long to escape the park and boulevard for some old granny's garden, where hollyhocks and pinks and jasmine grow and tangle as they will. Here it does not matter if the family cat sleeps under the honeysuckles or if the spiders build their webs in the corners. The turf is free to walk upon and the flowers can be touched and picked. Birds build their nests in the lilac bushes. The dew waits long in the morning, a setting of pearls everywhere. All this is peace and purity. How the memory haunts us in these older days! How we long for that old garden which was "a mere growth of the years"!

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FAILURES OF FRUITS.

PERHAPS there has never been a more complete failure of orchard fruits than this year. In all the eastern states the production is very small and mostly of inferior quality. Pears have, perhaps, been the most satisfactory crop in New York and eastward. Michigan, Wisconsin, Missouri and a few other states have a partial crop of apples, but there are few places in which there is a sufficient crop to make heavy shipment to eastern markets. There is almost a complete failure of fruits throughout the south. A few of the citrus fruits will give fair crops. California and Oregon alone appear to have escaped the general destruction. Along with this failure in fruits has gone a more or less unsatisfactory condition of general farm crops. As a whole, this is one of those "hard years" which leave an indelible impression upon our rural industries.

We should know the causes of all this. It is strange that while we are constantly inquiring into petty details we have overlooked these broader issues. Perhaps the very fact that we have applied ourselves so diligently to details and incidentals is reason enough for the neglect of larger questions. Nevertheless, the neglect is deplorable, and it must be remedied. Experiment stations must adopt a broader policy and allow their men to travel in search of information. There is danger of narrow work under narrow management. A tour of a state or region is often more useful to farmers and the experimenters than the cutting of seed potatoes or the sampling of strawberries.

The causes which are held to account for these failures are almost innumerable. Some of them are founded in ignorance and misconception, but have attained standing because of their age. It is strange how many things we accept simply because someone has said so! There are probably no more than five hypotheses advanced which can be held to account for general failure of fruit crops.

1. Cold, either during the winter or frosts in late spring. The greater part of the failures of the tender fruits in the north the present year, and the entire failure in the southern states, is unquestionably due to hard frosts following a February and early March of unusual mildness. Yet there are exceptions to this statement, even in the case of peaches, for in some of the lake regions of New York the peaches set, and attained to a considerable size before they fell. And the apple crop has failed in regions where there were no late frosts.

2. Lack of pollination. It is a venerable notion that a heavy rain at blooming time prevents pollination, even though it is well known that heavy crops often follow just such storms. There are no definite proofs that rains interfere with pollination

in general; neither, perhaps, are there proofs to the contrary, although the presumption is against the notion. At all events, we challenge the statement, in the hope that direct observations may be made.

3. Insects are often held to account for the failures, but insect attacks are of such a nature as to leave little doubt of their time and extent. Their work is visible, and it usually appears after the fruits have attained some size. In many parts of the country the curculio is the cause of failure of peach and plum crops year after year, and the devastation of the codlin moth in apples and pears is well known. But beyond these two instances, it is doubtful if insects cause the wholesale failure of fruit crops simultaneously over large areas.

4. Overbearing usually lessens the crop of the succeeding year, and is no doubt the commonest cause of failure of fruit. An overtaxed tree requires time in which to recuperate. But such trees do not bloom profusely the following spring, and the failure is easily enough understood. But in many parts of the country where fruit has failed this year there was a poor or indifferent crop last year.

5. This year it has been urged that fungi may be the cause of a widespread and complete failure. This generalization explains many of the obscurities which others do not, and it is abundantly supported by facts. It is no doubt true that fungi spread more rapidly than formerly, because of the greater number and continuity of orchards, just as contagious diseases spread faster in cities than in the country. In the small and isolated orchards of former days, fungi and insects were confined within closer areas. This phenomenon of rapid distribution, due to greater extent of host-plants, may be termed *communal intensity*.

The fungi which have been connected thus far with this breath of destruction are the scab fungi, as apple, pear and quince scab, the curl-leaf of the peach and the fruit-rots of the cherry and plum. They spread with marvellous rapidity in certain cool and wet springs, and as they exist year after year in nearly all localities to a greater or less extent, it is not strange that under favorable conditions they inflict wide areas. All this suggests a broader study of these fungi than mere life histories. Meteorological conditions, the general method of their transport, the kind of cultivation and the varieties in the orchards, and the relations of extent of orcharding to the injury done, demand thought.

But we doubt if the failure of the apple crop as a whole this year is due entirely to any one or all of these causes. Even the forest trees in many regions are unproductive, although they were not injured by frosts, nor by insects, and we know of no fungi which could cause the failure. In short, considered in the broadest sense, we do not yet know why fruit crops simultaneously fail over many states. The injuries to fruit after it has fairly set can be seen and traced, but this wholesale death of flowers and very young fruits is an obscure problem. The causes which we have discussed, except possibly in the case of frost—which is easily observed—are evidently too local or insufficient to admit of universal application. Who is the philosopher to enlighten our ignorance?

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WHO IS THE THEORIST?

"THOSE theoretical fellows," the experimenters and professors, cut a strange figure in the minds of many good people. It is the especial function of certain speakers at the winter meetings to ridicule them and their "hobbies," even while commanding their hearers to plant squashes in the old of the moon in June, and to pick geese only when the moon is on the increase, lest the feathers shrink! Even before one of the great horticultural meetings of the year, a prominent speaker characterized the experimenters as "theoreticians" who would not be likely to see the differences between varieties of plants! We had not supposed before that even the theorist is deficient in powers of direct observation!

This much-abused word theory is used by these persons to designate any wild, absurd or impracticable notion. Time was that hypotheses of doubtful character were projected by the teachers; but even then they were far fewer than is commonly supposed. And even those theories which have died of their own frailty have served an essential purpose in the discovery of facts. Truth is, the teachers are in advance of the practice and thought of their time, and their work is never appreciated until it is seen in retrospect. This is necessarily so, for the teacher's function is to lead.

But who, at the present time, is the theorist, in the common meaning of that word? Who plants his crops "in the moon"? Who fears to touch the heart of the tree, else he will kill it? Who washes his apple trees to close the pores and keep out germs? Who will not hoe his beans when the dew is on, for fear of blasting them? Who puts sulphur into the pear trees to kill the blight? Who carries pumpkin seeds in his trousers pocket to make the vines productive? Who sows turnips on the "25th of July, wet or dry"? A person can hear more "theory" at one farmers' institute than at all the agricultural colleges combined.

FIRST FRUITS

*** THE AMERICAN GARDEN *stands for simplicity, good taste, and correctness in names of varieties. In general botanical nomenclature, it follows Bentham and Hooker and Nicholson's Dictionary of Gardening. In the names of fruits, it adopts the catalogue of the American Pomological Society, and in vegetables the Station Horticulturists' revision in Annals of Horticulture. In florists' plants, it follows the determinations of the Nomenclature committee of the Society of American Florists. It opposes trinomial nomenclature, and therefore places a comma or the abbreviation* var. *between the specific and varietal names. It uses capital initials for all specific and varietal Latin names which are derived from proper nouns.*

THE AMERICAN GARDEN for December, closing the eleventh volume, will be an unusually attractive number. Accompanying it will be an Illustrated Supplement on Window Gardening, which will contain many valuable and interesting contributions upon this subject, in an attractive form. Every one of our readers who grows a single plant in the chill winter will find matter of essential value in this supplement. The various departments of the magazine will also contain articles of great interest and illustrations of more than usual beauty. A comprehensive index will also accompany the December issue.

With the high aim of producing a magazine yet more worthy of the great field of Horticulture, we shall use all our resources to make THE AMERICAN GARDEN for 1891 far superior to anything of the kind ever offered to the people of this country. An idea of the many specially attractive features prepared for our readers can be had from the prospectus to be found in the Publisher's Desk.

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PARKER & WOOD, Boston, are introducing a novel and meritorious folding wire plant-stand for house plants.

: : : :

PROFESSOR FRANK GULLEY, late director of the Texas Experiment Station, has assumed the directorship of the Arizona Station.

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THE WESTERN GARDEN AND POULTRY JOURNAL is a new monthly published at Des Moines, Iowa, with Chas. N. Page as editor.

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SIEBRECHT & WADLEY, New Rochelle, near New York, have one of the finest displays of tuberous begonias ever made. It is a remarkable collection.

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PROFESSOR H. E. STOCKBRIDGE has accepted the presidency of the North Dakota agricultural college. He leaves the directorship of the Indiana Station.

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PROFESSOR T. L. BRUNK, late of the Texas Agricultural College and Experiment Station, becomes professor of horticulture in the Maryland institution.

A. B. CORDLEY leaves an assistantship in the Michigan Agricultural College to become entomologist to the Vermont Station and professor in the University.

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DR. GEORGE L. GOODALE, professor of botany in Harvard University, sailed eastward Sept. 24th, for a trip around the world. He goes with a fine equipment for photographing and studying the floras of the many regions he will visit.

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THE signal service will be transferred from the War Department to the Department of Agriculture. This transfer removes the weather observers from the army and makes them civil citizens. In one way and another the agricultural interests are coming to be recognized as paramount.

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THE OFFICERS of the Botanical Club of the American Association for the Advancement of Science for the next year, are as follows: Wm. M. Canby, Wilmington, Delaware, president; Professor L. M. Underwood, Syracuse University, vice president; B. T. Galloway, Washington, secretary.

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CALIFORNIA AND OREGON appear to be the only states which have a good crop of fruit this year. Wisconsin, Missouri, Michigan and some other central states have very small crops, but in all the eastern states the crops of orchard fruits are very small, and mostly very poor. Grapes and cranberries are yielding well the country over. Those who sprayed for the black rot are rejoicing at the result.

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CHICAGO HORTICULTURE.—The Chicago Society, of which we spoke in the last issue (p. 620), has been incorporated as the Cook County Horticultural and Agricultural Society. The officers are as follows: John N. Young, president; Andrew Dunning, vice president; Robert Clark, secretary and treasurer. The directors are F. R. Crandon, Evanston; Andrew Dunning, Dunning Station; John Ure, Argyle Park; Robert Clark, J. A. Mason and Rufus Hall, Chicago. It is proposed to hold a flower show this fall.

THE CRANBERRY CROP.—The cranberry bogs in Middleborough and Lakeville will perhaps yield three quarters of the usual crop. In Carver, Wareham and on the cape the crop is about as usual. At East Head, just over the line in Carver, at Ellis Foundry, there are some four hundred acres of bog that will yield 15,000 barrels. The berries are fair size but not large. Middleborough and Lakeville will produce several thousand barrels. The Makepeace bogs in Plymouth and Barnstable counties will this year yield upward of 30,000 barrels, and it will be several weeks before the work of gathering them is completed.—*Boston Transcript, Sept. 24.*

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B. S. WILLIAMS MEMORIAL FUND.—A committee of prominent horticulturists, in England, is soliciting funds to be employed in creating prizes for orphans of gardeners, and which shall constitute a memorial of the eminent services of the late B. S. Williams, "This committee desires to raise a fund to perpetuate the memory of the late Mr. B. S. Williams, and by investing a sufficient amount be enabled to place a certain number of orphans of gardeners on the gardeners' orphan fund as 'Williams memorial orphans,' and also to give prizes in money with 'Williams memorial certificates' for excellence in the cultivation of plants." Contributions are solicited from anyone in any country who desires to perpetuate the memory of a worthy man in a noble cause. Already considerable money has been raised. Shirley Hibberd, Kew and H. J. Veitch, A. Outram and John A. Laing constitute the committee.

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HORTICULTURE AT THE OHIO STATE FAIR.—Notwithstanding the fact that this year has been an unfavorable one in Ohio for fruits, there was an excellent exhibit at the state fair this year. There were nearly a thousand plates of apples, over four hundred plates of grapes, a hundred and thirty-seven plates of pears, and several plates of quinces, peaches and plums.

Although the display of apples was very large, the quality was far inferior to that usually shown in Ohio. There were some specimen plates, however, that were very fine. They were not, as a rule, highly colored, and many were wormy or knotty. The method of exhibiting was in plates of five specimens each, which were arranged on tables about three feet high, the shelves on these tables a foot wide and each succeeding shelf three inches higher than the one next in front of it, until the middle of the table was reached. By this arrangement the six rows of apples could be seen from one side. There were 300 entries of single plates, and in some varieties there were a dozen competitors.

The pears were shown by four exhibitors, but most of the plates were from two exhibitors. W. W. Farnsworth, Waterville, O., had 13 entries, took six first premiums on single plates of varieties and four seconds on the same; and on six varieties for summer and fall he got first, and second on 12 varieties. C. W. Counter, Toledo, O.. made 17 entries, was awarded nine first and two second premiums on single plates, and first on twenty varieties, first on twelve varieties and second on six varieties. E. H. Cushman, Euclid, O., was awarded first on a new seedling pear. It is an unnamed seedling which has been in bearing for many years. It is about the size of the Seckel, but shorter, and more abrupt at the stem end, usually with a slight cavity about the stem. Season, at its home, is about October first. Quality nearly as good as the Seckel. When ripe it has a rich golden russet skin, with a bright red cheek when exposed to the sun.

There was no competition in peaches, and Mr. Counter received all the awards.

The display of grapes was never equalled in Ohio, either in size and appearance or in quality of grapes shown. They were shown on plates of four bunches each, arranged on tables in the same manner as the apples. E. W. Woodward, Kirtland, O., made the finest display, showing eighty plates and a total of thirty varieties. He was awarded first premiums on collections of 24 varieties, 12 varieties, 6 varieties, 3 varieties early table, 3 varieties late, and second on 3 varieties for white wine. He had twenty-five single plates entered and received 15 first premiums, and 6 second premiums on them. E. H. Cushman, Euclid, showed a fine lot of grapes in varieties, and was awarded 12 first and 4 second premiums on single plates. J. S. Snyder, Lancaster, O., Isaac Fruman, Rex, O., and Mr. Linxweiler Dayton, O., each showed a number of varieties. Isaac Staples, Dayton, O., was awarded first premium for new seedling, which is unnamed. Geo. W. Campbell, Delaware, O., showed five new seedlings, only part of which are named. The Moyer and Moore's Diamond were shown for the first time this year. The former is more loose on the stem than Catawba, which it resembles somewhat in appearance, but is redder. The largest clusters shown were of Excelsior, exhibited by Mr. Linxweiler.

There were four counties that made exhibits of one hundred or more plates of fruit The first premium was awarded to Lucas county, the second to Warren and the third to Delaware. At a meeting of the State Horticultural Society it was resolved to recommend to the Board that the premium money be paid according to the merit of the exhibit, that all worthy exhibits may receive a portion of the award.

In the professional list of plants there were about 1,600 pots, but they contained very few good specimen plants. The display was placed in Farm Product Hall, which is not a suitable place for flowers. Nor is Woman's Building, where the amateur list of plants was shown, any more suitable. There should be a building especially for plants and cut flowers.

At the meeting of the State Horticultural Society, the project of making out fruit lists for different sections of the state was discussed, and referred to the annual meeting, which will be held at Zanesville in December.

W. S. DEVOL.

FOREIGN NOTES.

The Revue Horticole is in favor of an International Congress at the Chicago Exposition.

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The International Exposition of Horticulture, at Berlin, cleared about $25,000 this year.

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Professor Oliver, director of the Kew Herbarium for thirty years, has resigned. He is succeeded by J. G. Baker.

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The Phylloxera in Algiers.—In spite of all the precaution taken by the Administration, the phylloxera is rapidly speading in Algiers.

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The Influence of the Electric Light on plants was shown in early spring, in a surprising manner, by the large linden trees of the Leipzig Square, Berlin. While the buds, which were exposed to the electric light, had already developed leaves, those on the other side of the trees had only begun to swell.—*Gartenund Blumenzeitung.*

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Interesting Discovery.—Mr. Morris, assistant in the Royal Gardens at Kew, has discovered that it is possible to obtain many new and improved varieties of the sugar cane from the seed, and by crossing and selection, the production of sugar can be greatly increased. The seeds are very small.—*Adapted from Revue de l'Horticulture Belge.*

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The Phylloxera.—The phylloxera has invaded the Department of the Marne, whence comes all the French champagne.

The phylloxera has appeared on the Rhine, and the vineyards of Mayence, Buberich and other places are attacked. Great alarm prevails among the vine growers.—*Journal of Horticulture.*

⁂

A New Sugar.—The sugar of Fahlberg has been surpassed by that of Ludwigshaver. The energy of this new chemical compound is wonderful. If a small piece from .10 to .15 of an inch long, and no thicker than the finest needle, be placed in a glass of water, it will so sweeten the latter that it must be diluted before one can drink it.—*L'Illustration Horticole.*

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Root Grafts on the Grape.—A person writing in *Le Progrès Agricole*, gives his experience with root grafts on the grape. As soon as the leaves had fallen from his vines he set out 200 plants of one variety and 100 of another. In June of the following year he grafted all the vines. Of the first lot 94 per cent. grew, and of the second 96 per cent. The grafts are strong and healthy and throw out no roots, and an entire year is saved.

Grape Culture in Chili.—During the last few years grape culture in Chili has developed in a remarkable degree, and Chili may now rank as the first grape-growing country of America. Nevertheless the production is not nearly equal to the demand, and in 1888, $682,000 worth of wine was imported (Germany sending $60,000 worth, and France $313,000). The export of wine from Chili in 1888 amounted to about $42,000.—*Deutschen Nachrichten von Valparaiso.*

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Tasmanian Apples.—These apples seem to bear the long sea transport splendidly, and if they can be sent over in sufficient quantity, we ought to be able to procure sound good apples throughout the summer months. The flavor is quite up to the mark. The quality of Fearn's Pippin and Rosemary Russet is superior to any specimens of these sorts I have ever come across in England. The Ribstons are fine looking, firm fruits.—*C. A. M. Carmichael in The Gardeners' Chronicle.*

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Obituary.—Herman Jäger, one of the most prominent German horticulturists, died Jan. 5, 1890, aged 75 years.

Dr. Alexander von Bunge, a celebrated Russian botanist, died June 18, 1890, aged 87 years. He is well-known as an author of many botanical works.

John Shaw, a well-known landscape gardener of northern England, died Sept. 14, in the seventy-ninth year of his age.

James Backhouse, head of the firm of James Backhouse & Son, died Aug. 31.

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Novel Exposition.—An exposition, to be held in 1892, is being organized in Paris. It is named "La Plante," and will be devoted entirely to plants, their production, uses, etc. The first section will show the living plant; the following ones will show the applications of plants in Decorations and Manufacture; Decorative Paintings, Designs, Sculptures, in which plants appear as models; School of Design; and finally the fifth section will show the History of the Uses of Plants. It is proposed to add a sixth section, which will be devoted to Landscape Gardening.—*Revue de l'Horticulture Belge.*

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A new Magnolia.—Mr. Wiesener, of Fanterroy-aux-Roses, last year exhibited a magnolia which he obtained from a Japanese horticulturist. E. A. Carrière names it M. Wieseneri. It is of undoubted Japanese origin. The flowers appear about the end of May, and possess an agreeable penetrating odor. The stamens have white filaments and are very numerous. The corolla consists of eight petals, the calyx of three sepals, all pure white. The leaves are oval-oblong, entire, quite thick, deciduous, and are borne upon a strong cylindrical petiole. The larger ones are about seven inches long and four wide. It is not known if the tree is hardy.—*Adapted from Revue Horticole.*

THEY SAY

This is an open department for the use of all interested observers, from whom correspondence is solicited on any topic of horticultural interest. Valuable items are frequently crowded out, but all will appear in due time.

Golden-Rod.

Summer burned the meadows all around her,
  Autumn walking softly through the land,
Gave the fields her radiant smiles for sunshine,
  Dropped the golden-rod on every hand.

Far against the woods its gold is shining,
  Tipped with diamonds in the early morn;
Back against the blue-gray mists we see it,
  Mingled in the fields of rustling corn.

Summer, doubtless, is a clever painter,
  Spring hath many a stroke at her command;
But which one can match the varied splendor,
  When the brush of Autumn paints the land?

—Elinor Baldwin.

What was the most profitable fruit you had this year? Everyone wants to know.

California Profits in Oranges.—The *Pomona Progress* of a recent date publishes the following figures concerning profits of orange culture in Southern California: "The following figures concerning the money there is in the orange industry have been obtained from the leading orchardists of Pomona. We have been extremely careful to get the exact figures. John D. Cason's orchard of 1,100 trees, ten years old, has yielded 2,631 boxes of oranges that were sold to the shippers here for $1.40 a box; that means $3,683.40 from eleven acres. The net profit is $3,530. R. F. House's eleven-year-old orchard of 1,800 trees yielded better; some of the trees bore four boxes of fruit. The whole crop of the orchard amounted to 4,261 boxes, which were bought on the trees at $1.40 a box, yielding $5,965, and a net profit of $5,250. Wm. O'Connor's orchard of twelve acres, or 1,200 trees, yielded 3,065 boxes that brought $1.25 a box, or $4,137.75 for the whole. C. E. White, who has the finest orchard in this valley, received the best price for his fruit. His fruit is of the Navel variety, and from his ten acres of ten-year-old trees he had 2,932 boxes, that were bought on the trees at $2.65 a box. Mr. White received for the crop a check for $7,769.80; in other words, his receipts were $776 an acre. Wm. Woody's orchard of 1,350 trees yielded 2,877 boxes that brought $4,314.50, or $331.88 an acre.

The largest orange orchard returns in this valley are those from the Meserve orchard. The trees, 1,640 in number, are twelve years old, and have the best possible care all the year around. They are Navel orange trees. Mr. Meserve sold his crop late, and got the highest price. He had 5,169 boxes that sold for $2.90 a box, and last week the fruit was paid for by a Chicago draft for $14,990.10. The net profit per acre from the Meserve orchard for the year has been $936. We don't wonder that the eastern people are incredulous at reports of such profits, but there is an abundance of facts to prove that the average bearing and well-kept orange orchard in this section is worth about $300 an acre, while we have known some orange orchards to yield a net profit of $1,000 a year. The Crafts' orange crop sold in 1888 at the rate of $1,173 an acre net, but that was unusual.

Horticultural Advice for Oregon.—As California, Oregon and a portion of Washington are the only prune producing districts on the continent, and as Oregon prunes head the list, why not set a few more prune trees?

You will probably not miss it if you set two thousand Italians, or one thousand Italians, five hundred Coe's Golden Drop (Silver prune), and five hundred Petite d'Agen (French prune); and if you wish to extend your acreage and become a fruit grower, put out one thousand Bartlett pears. If you still have a few acres of well-prepared rolling land—and make an orchard on no other—add two hundred Royal Ann and fifty Black Republican cherries; and if yet not satisfied, set King, Northern Spy, Baldwin and Gravenstein apples in equal numbers. By well-prepared land is meant that which has been deep-plowed, cross-plowed, thoroughly harrowed and sub-soiled, twenty to twenty-four inches deep; dead furrows every twenty feet apart for prunes, and every twenty-five feet apart for pears, cherries and apples. Set thrifty yearlings or two year old trees in dead furrows twenty and twenty-five feet apart; shovel on top dirt and set two inches deeper than grown in the nursery. The soil should be clay loam, with previous sub-soil. Dig no holes to hold water to sicken and kill young trees; in our wet climate it is not best.

Then if you wish a thrifty-growing, polished, paying orchard, give thorough and clean cultivation and careful trimming every year; thus you will have a ten-year old tree in five years, and a paying investment.

To illustrate what is meant by thorough and clean cultivation, note the following contract made by A. T. Hatch, one of the most successful fruit growers of California, and a fair sample of the California method. The contract price was $12.50 per acre, and includes the following specified operations:

First. Plow away from the trees, followed by harrowing.

Second. Plow towards trees, following by harrowing. Ten summer workings with cultivator. Three workings with shallow cultivator or weed cutter. Five hand hoeings around the trees.—PRESIDENT J. R. CARDWELL, *before Oregon Horticultural Association.*

For the Table.—*Raspberry Vinegar.*—Pour over four quarts of red raspberries sufficient vinegar to cover them, and let them stand twenty-four hours. Then scald and strain, and allow a pound of sugar to each pint of juice resulting. Boil twenty minutes and bottle. Will keep for years.

Unfermented Grape Juice.—Cook the grapes, strain the liquid, sweeten and boil a few minutes. Seal in airtight cans ; if this is well done the juice will not ferment. If mixed with a little water it makes an excellent tonic for the stomach.

Curry Powder.—Take one ounce each of ginger, mustard and black pepper, one-half ounce of cardamon, three ounces each of coriander and turmeric, quarter of an ounce each of coriander and cumin seed. Pound all fine, sift, and keep tightly corked. It is nice in soups, stews, or boiled meats.

Grape Jelly.—Bruise the grapes and put them in a porcelain kettle, turning on a half pint of water to each quart of fruit ; stew for ten or fifteen minutes and drain off the juice. Take equal measures of juice and sugar, heating the sugar thoroughly in the oven, mix with the juice and boil eight or ten minutes. Dip into jelly tumblers, and place in the sun to cool ; this will give the transparency so desirable.

Chow-Chow.—Take green tomatoes, cauliflowers, beans, small cucumbers, and small onions. Put them in a jar in layers of vegetables and salt. Let stand over night, then cover with vinegar and parboil. When sufficiently soft pour in mustard, allowing one-half pound of mustard to one quart of vinegar. Let boil up once more. A few cloves, red pepper and a little turmeric may be added.

Mushrooms.—America is said to be the most wasteful of all civilized nations as regards food ; especially is this true of those fruits of the earth which come to us without toil or expense. It would be a work of real beneficence to the poor of our land could we break down the prejudice and ignorance which lets car loads of valuable mushrooms decay every week in the year throughout the country. The edible fungi of the United States are said to number one thousand ; Dr. Curtis has proved that one hundred and twelve species in North Carolina alone are good, having found no less than forty in one locality, within a radius of two miles. Charles McIlvaine states that he has them on his table from April to December. In the southern states they can be had the entire year. The peasantry of Russia, Italy, China and Japan use them extensively, fresh and dried, in the place of meat, which they closely resemble in some respects. In England by the many, in America by the few, among the educated, are they sought after as a luxury ; but the laborer whose scanty bill of fare needs enrichment, passes them by through ignorance of their value. This state of affairs is really a disgrace to a practical people, and to one who, like the writer, knows by experience the pleasure of gathering, testing and finally eating "toadstools," it is unaccountable.—L., *Charleston, S. C.*

Gathered to the "Fruit."—In regard to Mr. Drum's criticism in "Conference Corner" for Sept., I should have explained that the expression to which he refers was only the printer's translation of my wretched manuscript. I wrote "when they are all gathered to the *feast.*" Perhaps I would not have been misunderstood had I said "when the seed-leaves are covered by the bugs." Of course the bugs do their injury when the plants are in a very young state. I thought that every one would recognize the error as a typographical one.—W. F. MASSEY.

The Sow-Bug.—The animal commonly known under this name is no bug at all, but belongs to the class crustacea, which includes the lobster, crab, etc. These differ from the class Insecta principally in the method of breathing, which is done by means of gills. The common sow-bugs belong to the order isopoda, family oniscidæ, genus parcellio, six species of which have been described. *P. vittatus* is probably the most common species, although some of the others are quite abundant. These crustaceans are found in all damp, dark places, and feed upon decaying animal and vegetable matter. They are perfectly harmless, and are much sought for by poultry, being with them a much more important article of diet than is commonly supposed. In former times the species of this family were much used in medicine, and one of the old books tells us that when dried and pulverized "they leave a faint disagreeable smell, and a somewhat pungent sweetish nauseous taste, and are highly celebrated in suppressions, in all kinds of obstructions of the bowels, in the jaundice, ague, weakness of sight, and a variety of other disorders."

A Garden Herbarium.—The horticultural department of Cornell University Experiment Station is making a large and important collection of cultivated plants. Collectors are sent to leading nurseries and botanists are employed in many parts of the country to collect the cultivated plants from commercial establishments. Everything upon the Cornell grounds is preserved, and recently Professor L. H. Bailey has turned over to the University his whole collection of cultivated plants. Not only the species, but all cultivated varieties are preserved. This is probably the first distinct attempt of this kind in this country.—*Botanical Gazette.*

A New Hollyhock Disease.—Miss Effie A. Southworth read a paper before the Botanical Club of the American Association for the Advancement of Science, upon a new fungus which attacks house hollyhocks and which she describes as *Colletotrichium Althææ.* It attacks the stem, petiole and leaves, often causing a serious loss of plants. Bordeaux mixture appears to be a remedy for it.

Potato Scab.—H. L. Bolly, of Purdue University, has been making a long and careful study of potato scab, and he is convinced that it is a bacterial disease.

A Dangerous Rubus Mildew.—While at the Biological Institute at Cold Spring Harbor, Long Island, I came upon a small area of *Rubus villosus* var. *humifusus* badly attacked by *Peronospora Rubi*, Rabenh. This mildew is a member of a most destructive genus—the genus that includes such enemies as the grape mildew, onion mildew, lettuce mildew, spinach mildew and several others, to say nothing about the potato rot, which was for a long time classified among the peronosporas. This is the first time, as far as I can determine, that this mildew has been found upon the rubus genus in this country, save the instance when the writer found the same fungus upon the black caps in a fruit garden. In Europe, where the species was first discovered, it has been taken upon two species of rubus, but different from either of the two above mentioned.

The fact of the presence of this mildew in this country is significant. It is well known that the members of the genus rubus are closely related, if we may judge by the way fungi behave, and this is one of the best means of getting a clue of kinship. Take, for example, the raspberry anthracnose, that has been quite destructive in some localities. It is common to the blackberry and black cap as well as the raspberry, and the same is true of various other fungi upon the genus. This being the fact, it is natural to expect that the mildew in question will spread to other members of the genus, and it is very likely will become a plague to the grower of small fruits. The closely allied species common to our vineyards was unknown to Europe until within the past few years, but having once found an entrance there, it has spread with great rapidity.

It seems to me that there might well be a fund in every state that could be drawn on for the destruction of such pests, when they are in small numbers and only in one place perhaps. The legislature of New Jersey saw the force of this, and at its last session passed a law setting apart a thousand dollars, that can be used each year for the suppression of fungous diseases. New York might well spend a few dollars in the destruction of a worthless blackberry that may otherwise prove a propagating bed for a mildew, that in time can play havoc in the fruit gardens of the whole country.—Byron D. Halsted, *Rutgers College*.

Drying Large Fleshy Flowers.—There are some parts of plants that loose a great deal of their beauty, not to say characteristic shape, by the ordinary process of drying for preservation between paper under pressure. For example, the leaves of the various kinds of pitcher plants are no longer the round long sacs for holding water that they were when growing, and the large blossoms of fantastic shapes so conspicuous, strange and beautiful in the orchid family lose nearly all, in ordinary drying, that made them attractive while fresh. Many persons with conservatories wish to preserve some of the floral specimens in a dry state, but usually give up in despair after one or two attempts in the ordinary dry way or by means of the various solutions that have been recommended from time to time.

During the past two years some experiments have been made with a view of finding some cheap and convenient way of preserving the tender parts of plants or those of peculiar shape in their normal form. Nothing has been found that is better than hayseed. For a body like the pitcher of a cephalotus, timothy seed is excellent. The pitcher may be placed in a vessel containing the seed, the cavity or "pitcher" being filled with the same material. I have simply hung the pitchers up in the open air filled with the seed, and had them dry in perfect form. With the tender fantastic orchid flowers for example, some of the lighter grass seeds, as those of red-top, are better. The main point is to have a light and absorbent substance that will fill up the cavities and at the same time be of some weight to hold the slenderest part in place. I have had some of the orchid flowers with long slender floral parts several inches long dried in this way, that is, packed in grass seed, and they have held their shape and much of their color for a year pinned to a door casing in the laboratory.

The method is so simple that any one can practice it. The material is cheap and the results are satisfactory. Simply have a large-mouthed vessel—I used straight-sided glass jars, holding a half gallon—and fill in the seed around the specimens carefully, and let them stand in a dry warm room.—Byron D. Halsted.

Hoeing.—The editor's ideas as the best method of hoeing (see pages 485 and 486) are undoubtedly correct for clay or heavy soil of any kind.

On the light sandy soils of east and south Florida, in dry weather, I should prefer the "scraper." I want *all* the surface hoed to kill every weed that has sprouted, even though not yet in sight; but the shallower this work can be done, the better the soil will resist a drouth. The more this light sand is stirred, the drier it becomes. I have often seen it as dry as gunpowder to the full depth the cultivator had run.

The more compact most of our soil can be left throughout the dry season the better the result. Of course, during the rainy season, when we have almost daily showers, it is no injury to stir the soil deeply, provided the roots of the plants are not injured. In fact, it is often a benefit by hastening the evaporation of the excess of moisture.—W. C. Steele, *Florida*.

Substitute for Glass (Conference Corner, August).—Having tried various methods and forms, I wish to state my decided preference for either cloth or manilla paper, *saturated* with pure *raw* linseed oil, without the addition of any other material.

Cloth coated with *boiled* oil always grows hard very quickly, and in a year or so becomes so rotten that you can punch a finger through it anywhere. On the other hand, cloth which has received two coats of *raw* linseed oil will be both air and water-proof, and still remain soft and pliable indefinitely.

Paper saturated with *raw* linseed oil is nearly equal to glass. It admits the passage of light quite freely, more so I think than heavily whitewashed glass.

When boiled oil is used, the paper is always more or less sticky, and in a year's time it becomes so rotten as to be worthless.

Such, at least, is the result of my experience in this climate.—W. C. Steele, *Switzerland, Florida.*

A Parable.

When youth's fair dawn before us lies,
With untried paths and sunny skies;
How oft the sage's lore we mourn—
"There is no rose without a thorn."

Still, when 'tis gained, the knowledge sought,
Proves often wisdom dearly bought;
Fain would age turn to youth's bright morn—
"There is no rose without a thorn."

And so with riches fond friends smile,
Yet do we doubt their faith the while;
'Tis thus, to all, the truth is borne—
"There is no rose without a thorn."

Too brief this life for sad repine,
Cherish whate'er of good is thine;
To perfect peace man ne'er was born—
"There is no rose without a thorn."

—J. Torrey Connor.

Stumps.—"Get out the stumps, that is the first step towards improvement!" Yes, get them out of the ground, but not off the grounds if you have a cultured mind and eye, for both will be gratified by a right use of them. Let me suggest a few modes of disposing of these cumberers of the ground. If you have much space, gather the stumps together in cones or pyramids, rising in successive steps from two to three feet each and a couple of feet in width. Care should be taken to pack the stumps well, placing one with roots up, the next down, and so on. The roots can be left as they came out of the earth or trimmed down to some degree of uniformity; the finest effects are sometimes obtained by the roughest work. Upon each step lay a good foundation of turf and loam, and plant ferns and fill in with brilliant annuals and perennials. The rough dark foundation will throw out the delicacy and colors of the flowers to perfection. If some regularity is desirable, each step can be planted with flowers of one tone only. Other stumps can be left in *statu quo* and covered with ivy; this will make a most effective background for delicate vines, such as the feather, coral, and segar vines or dwarf morning glory; they will add grace to the otherwise rather heavy effects of the ivy. A clematis growing over a stump is beautiful. Or if the stumps be simply hollowed out and planted with wild violets and ground ivy, a very charming effect will be obtained. Most comfortable seats can be made from large stumps if well dug out with back, arms and foot-rest. The bark should be entirely removed or insects will destroy it as well as the peace of the occupant of the chair.—J.

Wild Flowers and the Schools.—One of the local papers of Santa Cruz offered last spring a prize for the best collection of wild flowers made by the pupils of any one of the public schools of that county. Sixteen of the 54 public schools competed for the prize. The contest resulted in sending in no less than 3,542 specimens. Some of these were new to botanists. The collection was so rich and extensive that Dr. C. L. Anderson, a well-known botanist of Santa Cruz, was moved to make a complete catalogue of the flowering plants of the county. It was well known that this coast county had a very extensive flora, but until the catalogue was made very few were aware of the actual wealth in this respect. This is probably the first complete catalogue that has ever been made in a scientific way for any county in the state. The good work in this respect was begun by school children, stimulated by the prize offered by *The Surf*. It was further perfected by the editorial compilation of F. L. Clark.

What has been done in this instance could be done largely by the pupils of the public schools in all the other counties of the state. There would be little difficulty in finding public-spirited citizens who would offer prizes for the best collections, or, what is better, a number of them. The experiment was so great a success in Santa Cruz county that the promoters of that enterprise have suggested that a collection of all the wild flowers of the state might be made by the schools of the several counties, and that these should be catalogued and, with the specimens, be made one of the exhibits of California at the World's Fair in Chicago.—*San Francisco Bulletin.*

The Lilac.—This old-fashioned shrub, which was once found in almost every front yard, is not often called for now, and I do not think it is very generally known that there are a great many new varieties which are very desirable. The first of these to come into bloom is a double one. This has rather small flowers and the clusters are small, but it blooms several days earlier than any of the others and has a decided blue shade. Gigantea is indeed gigantic when compared with other varieties, in both plant and flowers, and is of a dark purplish lilac color. Virginalis, which is white, with a yellowish center, has larger and more compact clusters than the old white. Persian is a much more slender shrub, and the single florets are smaller, but the clusters are often extremely large. White Persian produces small clusters of small delicate flowers of a pear-white, and is one of the best and useful for cut-flowers. I have also another which I bought for White Persian, but which proved to be like the common Persian, except that the color verges more toward red than any other I have seen. It is among the best. A hedge-row made up of the foregoing and some other varieties, the names of which have been lost, is a very attractive object. The lilac produces seed freely, and as the dry seed vessels disfigure the bushes and diminish the crop of flowers for the succeding year, they should all be carefully removed as soon as the flowers fade. All the lilacs are very fragrant.—Wm. F. Bassett, *Hammonton, N. J*

Abobra tenuifolia (*A. viridiflora*).—*Abobra tenuifolia* is a rapid growing and beautiful climbing plant belonging to the natural order Cucurbitaceæ. It is a half-hardy perennial gourd-like plant, with tuberous roots, and attains a height of from twelve to fifteen feet. It has very delicate, dark green leaves, which are very finely cut, and small inconspicuous flowers, produced in profusion. The flowers are soon succeeded by small, bright scarlet, glossy, oval fruit, to which the plant is indebted for its beauty, and which forms a striking contrast with the dark green leaves. As the fruit is very freely produced, this alone renders it a very ornamental and desirable summer climber. The abobra is a plant easily cultivated, doing best in a well enriched deep soil, in a sunny situation, and as the root is of a tuberous character, it can be taken up on the approach of cold weather, and preserved during the winter in a manner similar to dahlias. It should be set out again towards the end of April.

The plant is increased by means of seeds, which are freely produced, and these can be obtained at any seed store. They should be sown in a well-drained pot or pan of light sandy soil about the first of April, and placed in a warm and moist situation. As soon as the young plants can be handled, they should be transferred into three-inch pots. Keep the young plants close and moist until they commence to grow, then gradually harden off, and plant out as soon as the weather becomes warm and settled. Support should be furnished as soon as the plant commences to run. When thus treated, the plant will do well and fruit freely during the summer season. In order to obtain the most satisfactory results from this, or any other ornamental climber, it is well to bear in mind that support must be given the young shoots as soon as they commence to run, and that they should be tied to their proper places as soon as possible. If these essential requisites are neglected, the plants will be injured, and can with difficulty be made to assume their proper place.—Charles E. Parnell, *Queens, N. Y.*

Anemone.—Of all the autumn-blooming plants none can compare in beauty and grace to the anemone. Its hardy constitution, and the fact that it produces great quantities of pure white blossoms at a time when white flowers are scarce, should make it a general favorite. All summer it has stood an unobtrusive plant, showing its dark green leaves, yet not courting notice. But as summer wanes and autumn approaches, clusters of round, hard buds begin to show. These push up, each upon its own slender stem, far above the leaves and sway and nod to every breeze, while the lovely flowers open, one by one, in pure white splendor, until the whole plant, and it is often a large one, is one mass of bloom, The flowers, in shape and size, are somewhat like our native dog-wood, yet delicate, dainty, waxen, with an indiscribable grace of their own. They fold together in the night to re-open the next morning when the sun touches them.

At the time of this writing, in early October, two large plants in the garden are white with bloom. The first flowers began to open in August; as they do not mind a few light frosts, they will probably last quite through the month. In dry seasons the plants require a good supply of water to bring out the bloom in perfection. I have written more particularly of *A. japonica* var. *alba*, the pure white variety, as it is most prized on account of its waxen white blossoms, which are much used for cut-flower work and funeral decorations. There is another variety, however, the var. *rubra*, of a deep rose color and equally hardy with the white.

The anemone planted upon the lawn is most unique, and will cause much comment from those who have never before beheld its wealth of bloom. As a cemetery plant it is invaluable and much used. It reproduces itself by numberless shoots which spring from the rootlets of the parent plant, and which appear like a vigorous young brood shyly peeping forth from the family shelter. The flowers are eight or nine petaled, white and delicate, with a small, yellow-stamened center. They are about two inches in diameter and grow upon long, willowy and graceful stems, which make them admirable for bouquet arrangement. They last a long time upon the plant, and still longer in water, and when worn, are admired by all who see them.

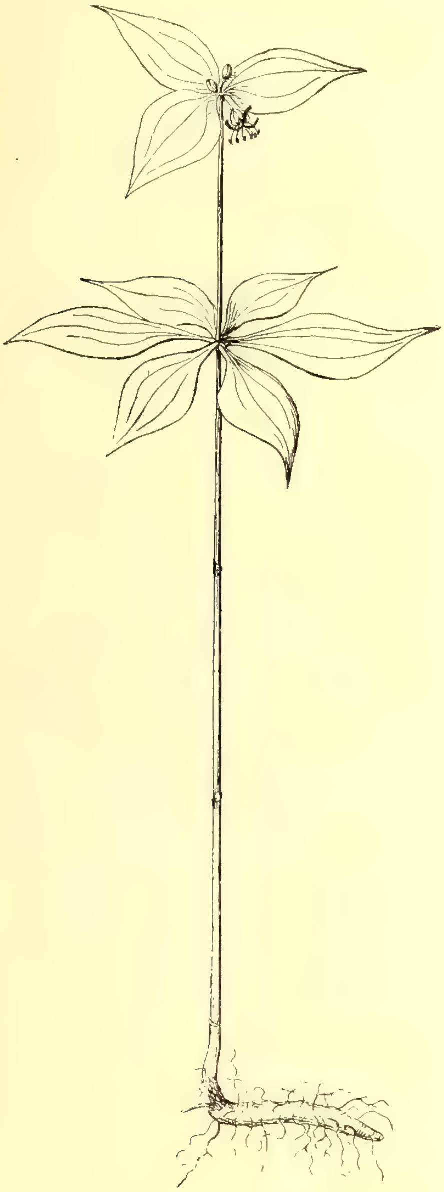
To the lover of flowers no one variety of plant is better adapted to our climate, affords more satisfaction, or is easier of culture, than the graceful, much loved *Anemone japonica*.—H. K.

Flowers for Sunday School Scholars.—An English paper gives an account of "a very successful flower show in connection with the Sunday School and Band of Hope, Union Chapel, Shirley." "It is intended that this shall be the first of a series of annual shows of a similar character." Prizes were given for a scarlet geranium, musk, fuchsia, calceolaria, fern, window hanging plant, specimen plant, bouquet of wild flowers, bouquet of garden flowers, basket of garden flowers, basket of wild flowers.

A City Garden.—A few notes from a little city garden may meet some kindred spirit somewhere. No garden is complete without *Scilla Siberica*, and to be effective it should be grown in clumps. I find that it delights in rich muck or leaf-mould. It seeds freely, and a large stock can be easily grown by sowing the seeds in rows in a bed of leaf-mould, or light soil. Every seed will grow and you will be surprised at the number of bulbs. They bloom the third year.

Cypripedium spectabile does well in a bed of similar material, and comes out of the ground just about the time the native yellow varieties are in bloom. Cut worms are very destructive to the latter, however, and I would not recommend planting a permanent bed of the yellow varieties, unless plants can be easily procured. Narcissus of various kinds are more commendable, and with scillas, narcissus and *Cypripedium spectabile*, a bed can be made that will give a succession of beautiful flowers during the first half of the season, and will be thankful if not disturbed.

The Cucumber-Root, *Medeola Virginica*, mentioned in the July and October issues (pp. 420 and 598) is shown in the accompanying engraving. Although an insignificant plant to most roamers in woods, it is nevertheless interesting, as, in fact, are all woods plants. One can never appreciate nature until he learns that form and habit and shades of green are no less handsome and attractive than flowers.


MEDEOLA VIRGINICA.

A Good Old Begonia.—We have heard persons remark that they did not know how people did in former times without bouvardias, winter carnations, and the many other floral beauties that help us so pleasantly to while winter away. It is certainly a wonder what we would do without begonias. I can remember when the old "Elephant's Ear" or "Beefsteak plant" (*Begonia Evansiana*), a half hardy herbaceous kind, was about the only one grown for its flowers to any extent, and certainly room gardening was never so gay as now. They seem so well adapted to window and room gardening, that surely nothing can equal them. Most plants turn to the light, and thus show how much they desire light, and miss it when it is lessened in amount. The begonia is the only plant we know of that does not turn to the light. It is quite satisfied to make the best of whatever situation it may be placed in, and therefore preaches an excellent sermon, while doing duty in making our rooms and windows cheerful in the winter time.—THOMAS MEEHAN.

Sensitive Briar.—The "Saw briar" or "Sensitive rose," is a wild plant which I have long admired for its beauty, perfume and oddity. It grows wild in the black-jack timber about Thayer, Neosho county, Kansas, blooming early and late. The plant grows about a foot high, and its stems are armed with small thorns which quickly deface the farmer's pantaloons about as high as the knees. It has a delightful perfume, which we compared to cologne in our pioneer days. The color and texture of the blossom is much like that of the brightest thistle, and it is as round as a marble. The leaves close when touched by the hand.—JAMES H. FERRISS.

[The sensitive briar, a specimen of which Mr. Ferriss sends us, is *Schrankia uncinata*, one of the Leguminosæ, and allied to the true sensitive-plant. The plant grows wild from Virginia and Florida to Kansas and Texas.]

Daisies, Pansies and Violets.—I have a cold frame for daisies, pansies, and violets, and always have a grand show in early spring. The violets and pansies bloom more or less during mild winter weather, and it is seldom that there are more than four or five weeks during the winter in which I do not gather a few flowers from either the pansies or violets; and when early spring comes the plants are covered with bloom, including the daisies. The cost of the frame per year is but little, and the trouble but a small item, for I give them but little attention after winter sets in.

I usually start my plants in July, and when well established set them in the cold frame, where they remain unprotected until severe winter weather sets in, when the sashes are put in place. No other protection is given. On bright warm days we raise the sashes and give the plants air. While all the above plants are hardy with us (that is, young plants), I find that a slight protection gives earlier flowers.—J. OLIVER WADLON, *Md.*

The Favorite Flower in New York.—The Superintendent of Public Instruction, Mr. Draper, has announced the vote for the State flower as follows: goldenrod, 81,308; rose, 79,666; daisy, 33,603; violet, 31,176; pansy, 21,202; lily, 16,438; lily of the valley, 11,626; trailing arbutus, 7,888; buttercup, 6,127: scattering, 29,045; total, 318,079. The scattering votes were distributed through 121 different varieties.

Cypripedium acaule in its native habitat varies in size and quality very much. In pine barrens, so-called jack plains, where even the white pine will not grow, it is a little stunted thing. In the leaf-mould of the pine forest, partly shaded, it grows to finer size, and is quite beautiful. It seems always to grow in sand, though it takes kindly to garden treatment, and, like any of the family, it is easily transplanted, The *Cypripedium parviflorum* grows generally in clayey loam, or stiff clay. But I never have found it so plentiful as at Powers, Michigan, where it grows in the sphagnum moss and wet muck of a tamarack swamp, associated with *Cypripedium spectabile*.—C. L. Mann.

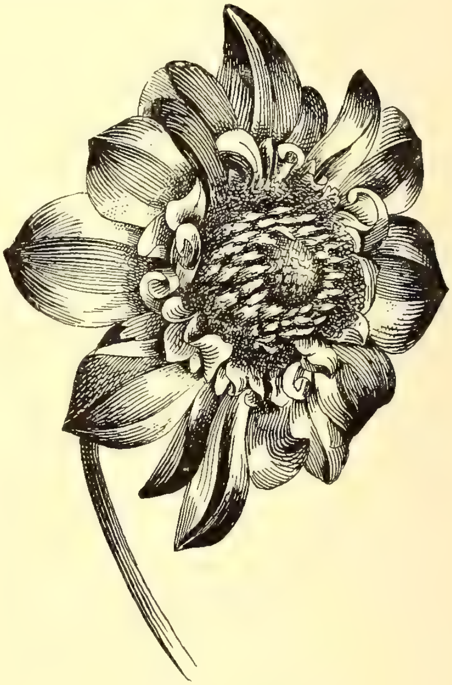
The Cape Jessamine.—We have among our flowers a cape jessamine that perhaps affords us as much satisfaction, with as little trouble, as any plant in our collection. We have had it at least twenty years, and it is a stout well-grown bush at least five feet high. It stands in an ordinary wooden tub in good common garden soil, which, with plenty of water, seems to meet all its wants. All summer long, and every summer, this bush bears many pure white, exquisitely fragrant flowers, which are a source of continual delight to us and to our friends. City visitors especially are enraptured with its beauty and seem to appreciate highly the opportunity of procuring occasionally a blossom without money and without price, for they have to pay dearly for them in the cities. Now any one possessing an ordinary frost-proof cellar to winter the plant in, as it grows too large for window or sitting room accommodation, can enjoy this charming shrub year in and year out at the cost of so little trouble as to be scarce worth mentioning. The greatest objection to it, with impatient people, is its slow growth, but give it time and it will attain to a goodly size and apparently live forever.

In the fall when danger of frost seems imminent, we have ours carried to the cellar, in which nothing ever freezes. There it stays all winter without one ray of light, for the cellar is perfectly dark. Every few weeks I see if the soil is getting too dry ; if so, I give it a thoroughly good watering. There the plant stays until it is convenient to take it out in the spring, and that is generally not until all danger of frost is past. It is then carried at once to a partially shaded part of the yard and left there for all the summer, as it is too heavy to be moved easily.

Another advantage of the cape jessamine is that it is never troubled by insects. The polished green leaves seem to resist all their attacks. As it is an evergreen, of course it never sheds its leaves—at least ours never did but once, when during its winter captivity it was neglected and became nearly dust dry. Then every leaf dried up and fell off. However it soon re-clothed itself in a beautiful suit of fresh foliage, but did not bloom that summer.

Cuttings are easily rooted by taking a small branch that has just dropped its bloom and putting it in a glass jar or bottle of water. Only put the stem in the bottle, of course, and leave the tufts of leaves standing out of the top. It can be placed anywhere. Change the water occasionally, once a week or so. They may root in two weeks and may not for two months. I started a dozen or more this summer, setting the glasses containing them in a north window where they were out of the way, and they soon formed roots. During the flood of 1884, when the cellar, and the house too, were full of water, our plant was submerged for ten days or two weeks. When the water subsided and the cellar could be pumped out, the cape jessamine came forth looking very dejected indeed, but still alive. Of course this mode of treatment is for such as are kept for "tub" or "cellar" plants ; but it is as such that I wanted to recommend it, as so many people seem entirely ignorant of its requirements, and imagine it is very difficult to raise.—Westover.

A New Dahlia.—I send you herewith a drawing of a new seedling dahlia. It is one of a dozen or more plants that are flowering this summer for the first time, having been raised from seed last year. The bulbs the first summer were, on an average, about two and one-half to three inches long, and about three-quarters of an inch thick, and consisted mainly of one bulb with little bulblets attached to them, in some cases about the size of peanuts. This summer they have formed plants four and five feet high, and all bear different flowers, some of them as double as any dahlia in the market. In fact, the one of which I send a drawing is the only single one in the lot. I had always heard that seedlings from double flowers mostly came single, so I was much surprised to find most of these double.



Seedling Dahlia.

I found this experiment so interesting that I am prompted to send you this one as a specimen, thinking that others might make experiments likewise, and be as much surprised as I was. Of one thing they can be sure, that whatever flowers they get will surely be new. The seeds were sown by my friend, James M. Bryant, and he gave me the bulbs to try and see what would come out. In selecting this one out of the whole collection, all of which turned out very beautiful, I was prompted by its brilliant colors; for the scarlet markings on its petals of yellow make it look like a blaze of fire, shading gradually from a bright sulphur yellow in the center through orange to dark scarlet at the tips.—WILLIAM GRAF, *Kirkwood, N. J.*

Number of Florists in Chicago.—The new Chicago directory, just published, which covers the 175 square miles of territory now constituting Chicago, under the business head of florists, contains the names of 153 firms doing business in the city proper. Add to these the names found in the American florists' directory, issued this year, of some 22 outlying towns doing more or less business in this city, we get some 64 more names, which added to the former gives the respectable number of 217 firms noted. A directory of 1851 contained one name—Samuel Brooks. One for 1857, if it embraced all, would add 3 more. That for 1881 had 56 names, which will show, if our total population has double in 10 years, the florists have gone one better and trebled in the same time.—*Prairie Farmer.*

Rose Buds on a Mission of Charity.—In a large hospital a young girl has wasted away day by day with consumption. Visiting ladies supplied her with books, delicacies, ect. She always had a pleasant "thank you" for these kindnesses, but seemed unusually reserved as regards her religious feeling. One morning I cut some of my lovely rose buds, and tied them with a few sprigs of mignonette, and wishing that the poor child might really believe a loving Heavenly Father had sent them, I wrote on a card and fastened it on the stems, "Come unto me all ye that labor and are heavy laden, and I will give you rest." I went to her bed, but her face was hidden, and her slight form convulsed with sobs. In her hand she held a tract, and my eyes glanced at these words: "Whatsoever thy hand findeth to do, do it with thy might, for there is no work nor device in the grave whither thou art hastening;" and underneath that, "Ye serpents! how can ye escape the damnation of hell?" The lady that gave her the tract was probably a Christian, but a stern and cruel one. "Look here, dear child," said I. She took the lovely flowers, read the comforting text, laid her cheek against them and murmured: "God is good, He loves me; I am not afraid." The flower mission is a beautiful charity. Let us carry these lovely blossoms to the sick, the sorrowful and the erring instead of these dreadful tracts. The flowers will always teach a heavenly lesson. The tracts may do real harm and cause positive suffering.—SISTER GRACIOUS.

Some Notes of Roses.—In the first place let the amateur buy only the more hardy roses, consulting some reliable catalogue for the necessary information, or an experienced rose grower. It is foolish and altogether unwise to waste time, labor, and money over the tender tea roses that will have to be removed from the garden borders every fall to sicken in the close and confined air of our keeping rooms; and if the plants come out alive in the spring they will do exceedingly well. Only a cold frame, laid in a sunny, sheltered nook, will insure good success in wintering. It is much better to buy hardy sorts. The hybrid perpetuals are excellent keepers, and will stand the rigor of our winters with only ordinary protection.

Roses need a good stiff clay soil, well enriched. If the soil is sandy, clay should be used with it. Daily attention should be given to the slug pest during the early part of the summer; but tobacco has at last shown its useful side. If a strong decoction is frequently applied it will soon exterminate these molluscs, and besides act as a useful stimulant to the plant.

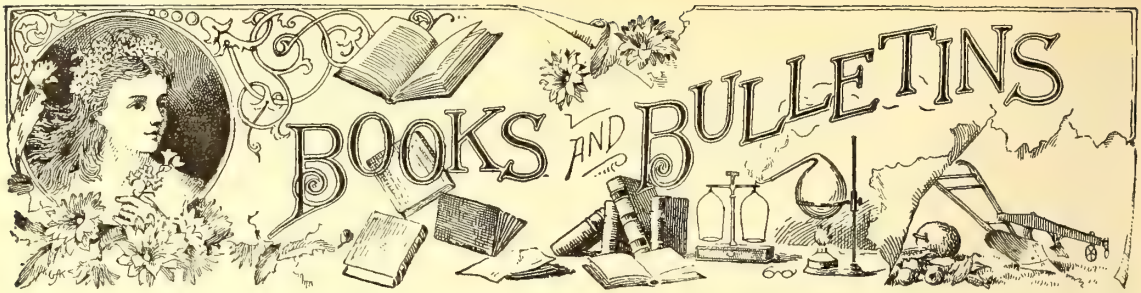
To raise roses from slips, *break* down the stray shoot from which the rose has just fallen, and plant it in a tin can. The uneven pieces that come from the parent stem is just the part that will callous and emit roots. A better plan still, and a surer one, is to crack the under side of strong healthy shoots, and then to peg them down in cans sunk at convenient distances and filled with rich earth. The cans should have a slot cut in the side nearest the plant for the passage of the shoot. When well rooted, cut from the parent stem, lift the cans, and you have your young plants in good condition and well started.

At the approach of winter bank earth about the roots of your roses, some six inches or more; and after the first light freeze or just before, add further protection in the shape of leaves fastened about the tops with brush or stakes. Evergreen boughs are still better, as they let in the air and do not hold dampness. In the spring, after removing the outer protection, cut back to the green wood. Often the entire plant will come out green and healthy but it should be pruned severely, if young, healthy flowering shoots are desired. The mound of earth may be removed later.

Among the most hardy, best flowering roses, are La France, Louis Van Houtte, Hermosa, Glorie de Dijon, Perle des Jardins. These bloom all the summer long, especially if well pruned, and this is best done by cutting the roses, bud and bloom, as fast as they appear. The stingy florist saves the first flowers, and thereby looses many later ones—not heeding that wherever one rose is cut with plenteous stem, two or three will appear in its place.

To the lover of flowers no one kind can afford more pleasure or profit with so little labor as the rose. It bids fair to become the favorite among all our summer and autumn flowers. Even the popular chrysanthemum cannot in our autumn days quite eclipse the equally popular rose.—H. K., *Germantown, O.*

An Energetic Squash Vine.—A Michigan exchange speaks of a squash vine which grew so rapidly that the blossoms were killed by being dragged along the ground!



THE GARDEN, AS CONSIDERED IN LITERATURE BY CERTAIN POLITE WRITERS. *With a Critical Essay, by Walter Howe. 16 mo., pp. 309, with a portrait of William Kent. New York: G. P. Putnam's Sons.* This choice bit of garden literature is made for "all who are fond of gardens and gardening, and who take a certain pleasure in enjoying nature when treated by man as a work of art." The essays are mostly well-known, especially among lovers of letters of nature and gardens, and they are all over a century old. The selection is a careful and varied one; all of them may be considered garden classics. There are extracts from the Plinys, Lord Bacon, Sir William Temple, *The Spectator*, *The Guardian*, Lady Mary Wortley Montague, Thomas Whately, Oliver Goldsmith, Horace Walpole and John Evelyn.

Literature of Gardens.

The compiler is certainly a person of taste. None other would have hit upon these gems. Mr. Howe's essay is an appreciative discussion of some of the choicer literature of gardens, and a presentation of the progress of taste in landscape gardening. He shows that ornamentation of landscape was at first but an architectural labor, and it was suggested by features of the hall and edifice. Gardens were mere settings for people of fashion, where "they and their guests posed before each other like the beauties and gallants of Watteau." The reaction from this intense artificialism was gradual in its beginnings, but it burst forth almost suddenly in its applications. William Kent was the leader in this revolution, and Walpole was his apostle who wrote of his plans and ideas. In the record of this dawn of reformation, or rather of evolution and purification of taste, we miss any reference to the writings of Pope. The poet certainly exercised a considerable influence upon the gardening of the time, and although it is slight as compared with the labors of later writers, it was probably more than that of Marie Antoinette, Jussieu and Richard. Mr. Howe supposes, and with reason, that the fluctuations in taste in landscape gardening are correllated with changes in other fine arts, as painting, music and architecture.

Those who have seen the "Knickerbocker Nuggets," of which series this volume is a part, need not be told that in daintiness of execution it has never been excelled. One's appreciation of the garden must be at once elevated if he only handles such an attractive book.

Systematic Botany.

CONTRIBUTIONS TO AMERICAN BOTANY, XVII. BY SERENO WATSON. *Excerpt from Proc. Amer. Acad. Arts and Sci. XXV, 124–163.* The occasional systematic publications from the Gray Herbarium of Harvard University have always been the most important contributions to the knowledge of North American plants. Dr. Watson's first detached contribution was made so long ago as 1873. From that time until 1885 his publications were companions to similar ones by Asa Gray, and since the death of the master they have continued his labor. In his seventeen papers, and in various volumes and reports, Dr. Watson has published more new species of American plants than any other author, except Dr. Gray himself. The contribution before us comprises "Miscellaneous Notes upon North American Plants, chiefly of the United States, with descriptions of New Species," and "Descriptions of New Species of Plants from Northern Mexico, collected chiefly by Mr. C. G. Pringle in 1888 and 1889." A number of the new species described in the first part will undoubtedly find their way into cultivation in the course of time. One of the most interesting of these is a new iris (*Iris Caroliniana*) discovered near Wilmington, North Carolina, in 1888, by W. A. Manda, and which is now being sent out by Pitcher & Manda.

Sargentia, a New Genus.

The most noteworthy plant in the Mexican collection is a new genus allied to the prickly ash and named *Sargentia*, in compliment to Professor C. S. Sargent, of the Arnold Arboretum. But one species is described, *Sargentia Greggii*, the specific name being given in memory of Dr. Gregg, an early explorer of the Mexican flora, and who first collected the plant near Monterey so long ago as 1847. The species "occurs abundantly in the cañons about the base of the mountains surrounding Monterey, as a large shrub or small tree with smooth gray bark, which cleaves off much as in *Platanus*." The naming of the genus is a graceful compliment to one of our most distinguished botanists, especially as he has aided Mr. Pringle to prosecute his explorations in Mexico.

New Genera.

Another new genus is *Rhodosciadium*, one of the umbelliferæ, a name which serves as a reminder of the rose color of the flowers, and as an obscure compliment to J. N. Rose, of Washington, who is a student of this difficult order. The only species, *R. Pringlei*, grows on hillsides near Guadalajura. *Jaliscoa*, named for the Mexican State Jalisco, is a new genus of compositæ, allied to the eupatoriums or thoroughworts. The only species is *J. Pringlei*, a sub-shrub six to eight feet high, with white flowers, and growing on cool ledges along the Rio Grande de Santiago.

The labors of Mr. C. G. Pringle are indelibly associated with the botany of Northern Mexico. For a number of seasons he has collected there, and numbers of plants have been named for him. There are twenty-one with the specific name *Pringlei* in the present enumeration.

Potato Scab.

SEVENTH ANNUAL REPORT OF THE MASSACHUSETTS EXPERIMENT STATION FOR 1889. In this report Professor Humphrey gives an account of some experiments upon potato scab. The following are results of field treatments: "1. Deep planting appears to tend to diminish the development of scab, though further experiments in this direction are very desirable. 2. While the very dark potatoes were wholly free from scab, little or no difference was to be noticed in the susceptibility of the three light varieties planted. 3. The potatoes raised on barn-yard manure were markedly more scabby and more deeply scabbed than the rest. 4. Tobacco dust in the drill had no appreciable effect in increasing or diminishing the scab. 5. Scabby "seed" produces a crop neither better nor worse than that grown from smooth potatoes." Professor Humphrey distinguishes two forms of scab, the "surface" and the "deep." "It is certain that our disease is the same as that discussed by German writers, and that it is not caused by any parasitic organism. Several years' observations at this station point, also, to the correctness of the view that the cause of our trouble is to be sought in peculiar physical or chemical conditions of the soil, though the opinion that excessive moisture is a sufficient controlling cause seems hardly tenable."

Onion Smut.

ANNUAL REPORT OF THE CONNECTICUT EXPERIMENT STATION FOR 1889. This volume of nearly 300 pages is especially rich in fertilizer tests and analyses. The part which particularly concerns the horticulturist is the report of Roland Thaxter, the mycologist. Dr. Thaxter has made a particular study of the diseases of onions, and has reported upon them here at considerable length. The worst onion disease in Connecticut is the smut (*Urocystis Cepulæ*). "The presence of smut in onions is first indicated by one or several dark spots at different heights in the leaves of seedlings, which are seen to be more or less opaque when the plant is held up to the light. These dark appearances may be seen in the first leaf, before the second leaf has begun to develop at all, and are more commonly found just below the 'knee;' though they sometimes occur above it. After a time, usually while the second leaf is developing, longitudinal cracks begin to appear on one side of these spots, which widen and show within a dry, fibrous mass, covered with a black, sooty powder made up wholly of the ripened fruit or spores of the fungus, which are blown or washed out onto the ground. In some cases the smut may appear only toward the upper end of the first leaf, and become cut off from the main body of the plant by the withering of the former. In such a case an onion which has shown smut in its first leaf appears, in some instances, to recover, showing no signs of smut in its subsequent growth; but as a rule the same dark appearance shows itself in the second leaf and those subsequently formed, and if the seedling is pulled up and examined, the whole plant will be found to be pervaded by the disease to a greater or less extent. Plants thus diseased, especially if the soil is dry, very commonly succumb early, dying while in the second or third leaf. The stronger plants, however, especially if the ground is moist, are able to resist the smut sufficiently to make a considerable growth, and may survive even up to the time of harvesting."

Several substances were drilled into the ground with the seed to destroy the fungus, such as sulphate of iron, a patent "germinator," sulphide of sodium, hyposulphite of sodium, sulphate of copper and sulphur mixed with lime. The sulphur and lime mixture proved to be the best remedy, all things considered, and it was a decided benefit to the plants treated with it. Equal weights of sulphur and lime were mixed, and 5 grammes (about 3½ pwt.) of the mixture was sown in the drill in 10 feet of row. Some excellent plates are given, representing the experimental plots, and of the structure and natural history of the fungus,

The onion mildew (*Peronospora Schleideni*), known also locally but erroneously as "white blast," has seriously damaged fields of seed onions in Connecticut.

Onion Mildew.

"An examination of the affected stalks showed that the trouble originated as a small yellowish discolored patch, usually on one side, from which the disease spread in all directions so as often to involve the whole stalk. The only visible appearance upon the the surface was an obscure, mould-like coating, white near the edges of the diseased spot, and slightly reddish near the center. This appearance of mildew was also noticeable on such leaves as had not been already entirely killed by it, and was very commonly followed by a velvety black coating, sometimes covering the stalks almost entirely and forming a conspicuous feature in the diseased fields. This black appearance is due to a fungus (*Macrosporium*) wholly unconnected with the mildew."

This disease is well known in Europe, and it is exceedingly destructive in Bermuda. It attacks the market onions as well as the seed crop. All infested onions and leaves should be burned in the fall, and the plantation should be removed to a fresh field. It is probable that some of the sulphur fungicides, applied early in the season, will be beneficial.

Other diseases of the onion are discussed, particularly two macrosporiums and a vermicularia.

Lima Bean Mildew.

A new species of mildew (named *Phytophthora Phaseoli* by Dr. Thaxter) has seriously attacked lima beans in Connecticut. This is an interesting discovery from a scientific as well as from a practical point of view, as there are only two other species of phytophthora known, one being the potato blight. This lima bean mildew "first shows itself as a spot, having a white, woolly appearance, usually on one side of the unripe pods. The spot extends rapidly during damp weather, penetrating and appearing on both sides of the pod, which it often covers completely with a clear, white, thick, woolly coating. At the same time the pod begins to decay, and usually ends by becoming shrivelled and black." Dr. Thaxter has not yet tried fungicides upon this mildew, and he can only recommend that the diseased pods be picked and burned, and especially that all diseased plants be burned in the fall.

Bordeaux Mixture for Grapes.

Bordeaux mixture (6 lbs. sulphate copper, 6 lbs. lime, 22 gals. water) applied to grapes six times (May 17, June 7, 13, 28, July 16, Aug. 3), proved effective against the rot, although the season (1889) was an unusually unfavorable one for the use of fungicides. "When the grapes were picked, Sept. 23, the untreated rows had proved a total failure, not maturing a single cluster, while the treated rows yielded from 60 to 75 per cent. in good condition."

Remedy for Plum Troubles.

The same Bordeaux mixture was applied three times (May 22, June 14 and July 16) to plum trees which "always set an abundance of fruit which was wholly destroyed by the fruit-rot, and in addition to this disease, were subject to black-knot and to defoliation by the plum leaf fungus." The "treated trees held their foliage intact up to severe frost in October, showed hardly any black-knot, and matured a fair amount of fruit; while the untreated tree was defoliated in August, matured no fruit, and was badly infested with the black-knot." The mixture does not adhere well to the plums, hence the fruit-rot was not controlled so completely as the other diseases.

Bordeaux Mixture for Potato Rot.

Bordeaux mixture (10 lbs. sulphate copper, 10 lbs. lime, 30 gals. water) was applied three times (July 18, 25 and Aug. 3) to potatoes which were badly attacked by blight. The weather was exceedingly unfavorable for the experiment, but the treated vines showed unmistakable evidence of the value of the fungicide for this disease.

Dr. Thaxter gives short notes upon a number of fungous diseases of fruits and garden plants.

Fighting the Codlin Moth.

First Annual Report of the Kansas Experiment Station for 1888. The report of the horticulturist and entomologist in this belated report comprises over a hundred pages, nearly equally divided between descriptions of noxious insects and records of tests of vegetables. Potatoes, peas and tomatoes were tested in great numbers, but there are no summaries or conclusions which will enable the cultivator to form a definite notion of what the experiments mean. The most important feature of the report is a record of experiments with arsenites and bands in fighting the codlin moth. The results are expressed almost entirely in tables without any summaries, and the full gist of the tests cannot easily be determined. London purple and Paris green were found useful in destroying the insects, and it appears that a second application after an interval of nine or ten days gave a gain of 3.2 per cent. over one application. The late brood of larvæ is not destroyed by the arsenites, and Professor Popenoe thinks that trapping by bands and pasturing with swine is a necessary adjunct to the spraying. An experiment with bands indicated that about 8.5 per cent. of the total number of insects attacking the fruit was captured. This is considered sufficient return to pay for the practice. Dates of blooming of many varieties of apples are given as a guide to the proper time for spraying.

Conifers for Kansas

Bulletin No. 10, Kansas Experiment Station. *Notes on Conifers for Kansas Planters. By E. A. Popenoe. Pp. 14.* Professor Popenoe prefers, "as a rule, to move evergreens, as indeed we do all trees, in the spring, just before the buds open and the shoots push. At this period the conditions are most favorable, because the tree is exposed for the shortest possible time to injury by loss of moisture from the leaves, as it is now pushing new roots, and the spring rains may be expected at this time to assist its revival. Success has usually followed our trials of winter planting where proper precautions have been taken to preserve a large ball of frozen earth about the roots, and to avoid the bruising of the branches of the tree, an injury from which they do not easily recover. Protection to the branches is best afforded by drawing them carefully toward the tree, and wrapping and cording to place the whole lower part exposed to danger in handling, in burlaps, old carpets or similar material. So guarded, the tree may be loaded by tackle upon a sled or stone-boat, and moved with the minimum of danger. In this method of planting, it is of course essential that, on resetting, the crevices about the frozen ball of earth be compactly filled, lest on thawing, the earth fall away from the roots and expose them to dry air."

The species which have done the best upon the college grounds, and which are recommended, are these: red cedar, Austrian pine, Scotch pine, Table-mountain pine (*Pinus pungens*), dwarf mountain pine (*P. montana*), pitch pine (*P. rigida*), southern yellow pine (*P. mitis*), white pine, Norway spruce, white spruce, Colorado blue spruce (*Picea pungens*), Siberian arbor-vitæ, bald cypress (*Taxodium distichum*), gingko, European larch.

Corn Crosses.

Bulletin No. 11, Minnesota Experiment Station. This bulletin is concerned with subjects which belong to the field rather than to the garden, but we cannot refrain from speaking of some interesting notes upon cross-fertilization and variation of maize. Mr. Hays has in all instances found an immediate effect of fertilization in corn. This effect is easily seen when corns of different colors are used. His most interesting record is an account of the offspring of a supposed accidental cross between a yellow flint and a black sweet corn. On some ears six or seven kinds of corn were produced, ranging all the way from white to red, yellow and black, and from flint to sweet corn. The white and red colors did not exist in the immediate parents, and Mr. Hays supposes them to be reversions to some ancestor or to some previous cross. The laws of plant variation are so little known that the source of the characters can not be determined in this case, but there is apparently no reason to invoke atavism to account for them. Species and varieties often "break" when their characters are disturbed by violent crossing, and we do not know that the apparently new characters which are obtained are apt to be ancestral.

Nevada Rose Pest.

BULLETIN NO. 9, NEVADA EXPERIMENT STATION. *A Serious Rose Pest. By F. H. Hillman. Pp. 4. Illustrated.* "A serious insect pest is at present creating great havoc among the rose bushes by burrowing into the buds, and, in fact, frequently removing all of the flower, with the exception of the enveloping calyx. In some of the cases coming under my observation this injury is confined to a part only of the buds; but in many cases, all of the buds are either seriously injured or entirely destroyed." The insect is considered to be the same as the apple and peach fruit-borer, *Lithophane antennata*. Attracting the moths to lights at night and placing crude carbolic acid near the bushes to repel them are the most feasible preventives yet suggested. Thorough sprayings of Paris green, London purple and white hellebore did not dispatch the larvæ.

Apple Tree Lice.

BULLETIN NO. 11, NEVADA EXPERIMENT STATION. *Plant-lice infesting the Apple. By F. H. Hillman. Pp. 7. Illustrated.* Three species of plant-lice are discussed, two infesting the twigs and leaves and one (*Schizoneura lanigera*) the roots. Their natural parasites are also discussed. These species occur in the east as well, and the remedies are applicable everywhere. Kerosene emulsion, tobacco decoction and carbolic soap spray are recommended for the species infesting the twigs and leaves. "These should be sprayed upon the infested surfaces, thoroughly wetting them, in order that as few as possible of the lice shall escape contact with the liquid. * * * In the case of the root lice, owing to their subterranean position they are hard to combat. However, by digging a shallow trench about the infested tree in autumn, and pouring in either of the above remedies, allowing it to soak down among the roots, will doubtless attain the desired end. It must be borne in mind, however, that kerosene can be used for this purpose with great care only, possibly not at all."

Apple and Pear Bark-Lice.

BULLETIN NO. 4, VOL. 3, OHIO EXPERIMENT STATION. This bulletin contains general directions for spraying trees and plants for insect and fungous attacks, by Professor Weed, and Miss Freda Detmers gives illustrated "Directions for Collecting, Preserving and Studying Plants." Professor Weed gives a good discussion of the bark-lice of the apple and pear. Two species occur to a serious extent in Ohio, the oyster shell bark-louse of the apple, and the scurfy bark-louse (*Chionaspis furfurus*) which attacks both apples and pears. "During the winter and early spring as many of the scales should be scraped off the trunk and larger branches as possible. On large trees this may be done by first scraping with some instrument like a hoe, and then thoroughly scrubbing with a scrub-brush or broom dipped in a solution made as follows: Add one part of crude carbolic acid to seven parts of a solution made by dissolving one quart of soft soap, or one-fourth of a pound of hard soap, in two quarts of boiling water. The scraping is especially desirable for the oyster shell species, and on large trees. The bark of young trees is so tender that they must be scraped carefully, if at all. A scrub-brush is the best thing to use for applying the soap mixture, as the bristles remove many scales which a cloth would slide over. Then in May or June, soon after the young lice have hatched, the trees should be sprayed with kerosene emulsion. The emulsion must be thoroughly mixed, with none of the kerosene floating separately, or it is liable to injure the foliage. When the lice are young they are very readily destroyed by the emulsion."

Buffalo Tree-Hopper.

The buffalo tree-hopper *Ceresa bubalus*), a small greenish or yellowish bug about the shape of a beechnut (but only ⅓ inch long), is very injurious to apple twigs in some places. It punctures the twigs late in summer or early in the fall in the process of egg-laying. "It seems to me that the insects might be successfully fought just after hatching from the eggs, by spraying with kerosene emulsion. With this end in view, the infested trees should be carefully watched during May, and as soon as most of the eggs are hatched, the trees should be sprayed with kerosene emulsion. In those cases where the trees are infested by bark-lice, as well as the present pest, the same spraying may be made to kill both. By destroying the progeny of the eggs in this way, the crop of egg-laying specimens will be reduced, but it will not necessarily prevent the hoppers which develop in neighboring localities from invading the orchard to deposit eggs."

Preservation of Wines.

BULLETIN NO. 87, CALIFORNIA EXPERIMENT STATION. *The Conservation of Wines. By E. W. Hilgard. Pp. 4.* There is an effort on the part of certain persons to discourage the use of physical means for the conservation of wines. The chief physical treatment is "pasteurizing," or the application of heat for the purpose of killing the germs of "wine sickness." Those who oppose this and related means, employ "operations involving much deeper changes in the wine, such as fining, sulphuring, addition of tannin, spirits, addition or removal of acids, etc." Professor Hilgard upholds the proper use of physical agencies as more satisfactory and less injurious to health than the addition of conserving substances. "The self-constituted guardians of wine purity on this line simply push the wine-maker and merchant to the utmost temptation to the use of antiseptics, by the ill-advised, illogical and fanatical outcry against the treatment of wine by physical means for its conservation."

"Of course, wines known to have been prepared with all due care and sufficiently matured, will hereafter, as heretofore, be capable of safe-keeping and shipment without any preventive treatment." But with present methods of manufacture and haste to secure "age," treatment is often necessary. The bulletin gives extracts from recent European investigations which commend physical means of sterilizing. Recently, Bernardi has sterilized wine by passing a battery-current through it, and he finds the results better than those obtained from pasteurizing. Dr. Frazer, of San Francisco, has accomplished the same result by an electro-magnetic process. In the great wine districts of Algeria, filtration has recently become an important method of conservation. The Chamberland filter, now largely used for filtering water for domestic use, is employed for this purpose. The indications are that this is the best method yet devised of conserving wines.

Fruits for the Northwest.

BULLETIN OF THE IOWA AGRICULTURAL COLLEGE. *1890. Revised notes of the Pears, Cherries, Plums, Apricots, Peaches* [also Apples], *Ornamental Trees, Forest Trees and Shrubs, which have been tested on the College grounds and sent out for trial during the past ten years. By J. L. Budd. Pp. 32.* This pamphlet, which must not be confounded with the bulletins of the experiment station, is a sort of manual of the hardier and better fruits, especially Russian, of the northwest. General notes upon the care and management of the different fruits are also given. The Russian mulberry has disappointed Professor Budd, and he is no longer propagating it for distribution. The Chinese peach imported by the College has proved hardier than the common peaches, and the author is confident that "they will prove valuable on the northern borders of the peach belt." Of dwarf juneberries he reports as follows: "During the past eight years we have been experimenting with twelve varieties of dwarf juneberry. All of them have proved heavy bearers of fruit fully as good in quality, to my taste, as the swamp huckleberry. But the Osage, Green County, Alpina and a variety imported from Moscow, have proved most satisfactory in bearing and the largest and best in fruit; hence we are sending them out for trial. When this fruit is planted by the acre or half-acre, the crop does not seem to be materially lessened by the birds; but a few trial bushes are cleaned as fast as the berries ripen, unless covered."

BULLETIN NO. 10, IOWA EXPERIMENT STATION. Two discussions in this bulletin are of great importance to horticulturists. "Experiments with Arsenites" is contributed by C. P. Gillette, station entomologist. Mr. Gillette has made an unusually interesting and valuable series of tests, the most important, no doubt, yet undertaken upon this subject by the stations. We give his conclusions, together with comments of our own.

"The oldest leaves are most susceptible to injury from arsenical applications. They often turn yellow and drop without showing the burnt, spotted appearance."

"Dews, and probably direct sunlight, increase the injuries done by the arsenites to foliage."

"Leaves kept perfectly dry can hardly be injured by the arsenites, even when they are applied very abundantly." This, we take it, refers to the application of the poisons in a dry condition.

Arsenites and Foliage.

"Applications made in the heat of the day and in the bright sunlight do not injure foliage more than when applied in the cool of the day." So far as the influence of sunlight goes, this conclusion appears to be a direct contradiction to the second statement, above. It agrees, however, with tests made at another institution.

"The only effect of a heavy rain or dashing shower following the application of one of the arsenites, is to lessen the injury to foliage."

"Leaves suffering from a fungous disease are more susceptible to injury than are healthy leaves." We do not understand that this statement means that poisons injure diseased leaves more than healthy ones, although it plainly says so, but that the injury is obscured by the presence of the fungus. In the text of the report it is stated that "applications to leaves attacked by a fungus will often *appear* to do serious harm."

"When freshly mixed and applied, London purple is most and white arsenic is least injurious to foliage."

"White arsenic in solution should not be used upon foliage without first adding lime, Bordeaux mixture or some other substance to prevent its injurious effects upon foliage."

"White arsenic, if allowed to stand many days in water before being applied, will do far greater harm to foliage than if applied as soon as mixed."

"Lime added to London purple or Paris green in water greatly lessens the injury that these poisons would otherwise do to foliage." This is a most important discovery. "In these experiments the lime was prepared by putting about a bushel of the lumps in a barrel and covering well with water until all had slaked. Each time before removing the lime water for use, it was stirred until very milky, and then the quantity wanted was dipped out, and more water added to be ready for use at another time. It was my intention each time to have as much lime in the water as could be used without clogging the sprayer." London Purple thus prepared injured peach foliage to an extent of only 1 per cent. when applied at the rate of 1 pound to 200 gallons, while a simple mixture of this strength is fatal to it. It is a singular circumstance that lime should have just the opposite effect upon arsenic which is not in complete solution.

"Lime added to a mixture of white arsenic in water will greatly increase the injury that this poison would otherwise do to foliage. If the arsenic is all in solution, the lime will then lessen the injury, as in the case of London purple or Paris green."

"London purple (Paris green and white arsenic have not yet been tried) can be used at least eight or ten times as strong, without injury to foliage, if applied in common Bordeaux mixture instead of water." This is a still more important discovery than the saving influences of lime, not only because the injury to foliage is less, but because of the value of Bordeaux mixture as a fungicide. "Perhaps it can scarcely be believed, but it is none the less true, that I have been unable to produce the least harm upon plum or peach foliage with London purple in standard Bordeaux mixture, in the proportion of 1 pound to 50 gallons." If these results are confirmed by future experiments, this will prove to be the most important modification of arsenite applications yet devised.

"The arsenites cannot, by any ordinary method, be successfully mixed in a kerosene emulsion."

"The arsenites mix readily in rosin compounds, and do not seem to be more injurious to foliage than as ordinarily applied in water."

"The arsenites in strong soapy mixtures do considerable more harm to foliage than when applied in water only."

"The arsenites mix readily in carbonate of copper solution, and do not seem to do more harm than when applied in water only."

"London purple in sulphate of copper solution does vastly more harm than when applied in water only."

It will now be necessary to determine if the combining of these various insecticides and fungicides lessens the effectiveness of them. Chemical reactions must take place to a greater or less extent, and it will not be surprising if the merits of some of the compounds are injured. Mr. Gillette has not tested this point with fungous diseases, but he has done so to a limited extent with insects. Larvæ working upon the black-walnut were confined and fed with London purple, Paris green and white arsenic in the proportion of 1 lb. to 200 gallons of water, combined both with lime and Bordeaux mixture, and they died in a short time. Walnut foliage was also sprayed with London purple and white arsenic in combination with lime with good results.

Stocks for the Cherry.

"Stocks for the Cherry, Plum, Prune and Apricot" is the subject of a suggestive paper by Professor Budd. He discourages the use of the mahaleb stock for the cherry, because of its dwarf character, the inability of most hardy cherries to make a good union with it, and its lack of adaptability to heavy soils. The mazzard is a far better stock, but as it is too tender for the northern prairie states, long scions should be used, and the root set very deep in order that roots may start from the graft. Professor Budd has no difficulty in grafting cherries in winter, by keeping the scions dry enough so that they will not start before being used, and by keeping the grafts cool and perfectly dormant after they are made. Morello stocks are hardy and probably the best for the hardy cherries of the west. There is little difficulty from the sprouting of morello roots in the orchard.

The native wild red or bird cherry (*Prunus Pennsylvanica*) is a good stock for "all varieties tried of the morellos, dukes and heart cherries, by either grafting or budding." It does not sprout badly in cultivation, and Professor Budd is convinced that it will be much used when its merits become known. The native sand cherry (*Prunus pumila*) is also a good stock, notwithstanding the fact that in the wild state it is a low and straggling grower. "As yet its use for stocks is somewhat experimental, but we can say positively that it unites well with our hardy sorts in budding, and it does not dwarf the sorts worked upon it to a greater extent during the first five years of growth than does the mahaleb. The pits are obtainable by the car load in northwest Nebraska and west Dakota, and it should be given an extended and fair trial."

Stocks for Plums.

For plums, the myrobolan stock is commonly used. It is not hardy enough for budding in the west, and the "hardy native and foreign varieties do not unite well with its wood in crown grafting." The Damas and St. Julian stocks are also unsatisfactory for the west. Professor Budd recommends native stock, *i. e.*, those of the wild plum, for all sorts of plums. The hardy prunes, as Black and Ungarish, "also do best on our native plum stocks."

Stocks for the Apricot.

Russian and Chinese apricots have been worked upon myrobolan and St. Julian stocks, but the native plum appears to be best.

Professor Budd believes that fruits are better upon their own roots, and he gives directions for growing the stone fruits from root-cuttings. L. H. B.

Paris Green, London Purple and Peach Foliage.

BULLETIN NO. 18, CORNELL UNIVERSITY EXPERIMENT STATION. *Experiences in Spraying Plants. By L. H. Bailey. Pp. 13. Illustrated.* Professor Bailey's investigation upon the solubility of London purple as compared with Paris green shows that over 50 per cent. of the arsenic of London purple is quickly soluble in water, while Paris green contains no soluble arsenic. This discovery explains many of the instances where injury to foliage has followed the use of London purple, and emphasizes the importance of thorough investigations on the part of experiment stations before these institutions assume to give instruction to farmers and fruit growers.

Tested upon the susceptible foliage of the peach, London purple was found decidedly more injurious than Paris green.

After these important results, it is a little surprising that Professor Bailey does "not discourage the general use of London purple." Those who have damaged the foliage of their apple and plum orchards by the use of this poison will hardly feel disposed to employ it further in the face of Professor Bailey's most satisfactory explanation of the injurious results.

The investigation was performed upon peach trees, and the following is the summary of it:

"1. Peach trees are very susceptible to injury from arsenical sprays.

"2. London purple is much more harmful to peach trees than Paris green, and it should never be used upon them in any manner.

"3. Injury is more liable to occur upon full-grown foliage and hardened shoots than upon young foliage and soft shoots.

"4. The immunity of the young growth is due to its waxy covering.

"5. Injury late in the season is more apparent than early in the season, because of the cessation of growth.

"6. Injury from the use of London purple may be permanent and irreparable.

"7. The length of time which the poison has been mixed appears to exercise no influence.

"8. London purple contains much soluble arsenic (in our samples nearly 40 per cent.), and this arsenic is the cause of the injury to peach foliage.

"9. A coarse spray appears to be more injurious than a fine one.

"10. A rain following the application does not appear to augment the injury.

"11. Meteorological conditions do not appear to influence results.

"12. Spraying the peach with water in a bright and hot day does not scorch the foliage.

"13. Paris green, in a *fine spray*, at the rate of one pound to 300 gallons of water, did not injure the trees. Probably one pound to 350 gallons is always safe."

Nozzles for Spraying.

The bulletin also gives the results of a trial of nozzles, and it concludes that for large trees, the nozzles known as "Gem," "Mystic" and "Boss" best answer the requirements. He also proposes an ingenious device for compressing the end of a hose, causing it to throw a thin stream, as a substitute for a metal nozzle. While I have not seen this apparatus tested, the question arose, if the continual holding of the cord by which the size of the opening at the end of the hose is adjusted would not become a serious annoyance. In my experience with the Boss nozzle, I did not find it necessary to use a pole, but was able to spray the tallest apple trees satisfactorily while holding the nozzle in my hand.

Failure of the Apple Crop.

BULLETIN NO. 19, CORNELL UNIVERSITY EXPERIMENT STATION. *Condition of Fruit Growing in Western New York. By L. H. Bailey. Pp. 16. Illustrated.* Professor Bailey ascribes the general failure of the apple crop in Western New York chiefly to an unusual development of the apple scab fungus, *Fusicladium dendriticum*, and recommends treating the trees with at least three applications of ammoniacal carbonate of copper, one treatment to be given before the blossoms open, one just after they fall, and another three or four weeks later. The formula recommended is to dissolve 1 ounce of (precipitated) carbonate of copper in 1 quart of aqua ammonia, and dilute when ready to apply with 25 gallons of water.

For the quince leaf-blight (*Entomosporium maculatum*) he recommends spraying the trees with the Bordeaux mixture, made as follows: "Dissolve 6 lbs. sulphate of copper in 16 gals. of water. In another vessel slake 4 lbs. of fresh lime in 6 gals. of water. When the latter cools, pour it slowly into the copper solution, mixing the two thoroughly. It is best to prepare the mixture a day or two beforehand."

The chief cause of the failure of the peach crop is thought to be the "curl-leaf" (*Taphrina deformans*). The "yellows" of the peach is briefly described, and peach growers are warned to cut out every affected tree.

To avoid injury to the raspberry from anthracnose (*Glœosporium venetum*), it is recommended to keep the plants in a thrifty condition. Experiments in Wisconsin show that the foliage of the raspberries and blackberries are susceptible to injury from fungicide applications.

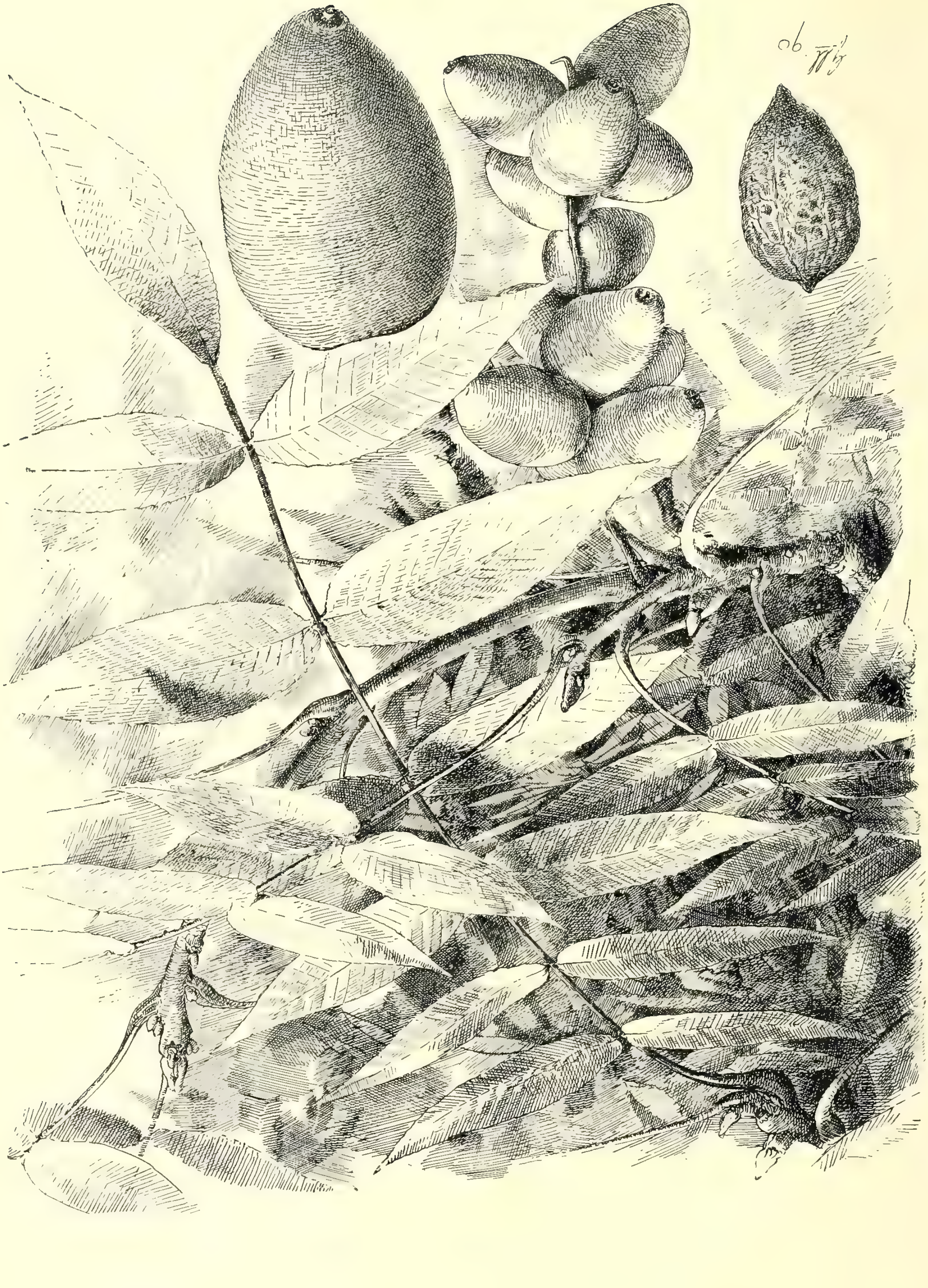
For the strawberry blight (*Sphærella fragariæ*), it is suggested to spray the plants "once in a week or ten days from the beginning of the growing season until the fruit begins to ripen," with a solution of potassium sulphide (liver of sulphur), at the rate of 1 ounce to 8 gallons. After the crop is gathered the plants may be mown or burned off, or destroyed by spraying with one pint sulphuric acid in six gallons of water. New leaves soon start up and the plants are not injured.

"The mildews and rots (of the grape) can be kept in check by a timely and persistent use of Bordeaux mixture. Begin before the flowers open, and spray every week or ten days until well into August."

Fruit growers are urged to secure a state law to aid in the control of contagious plant diseases. E. S. G.

The books practical and poetical which relate to flower and field,
stand wedded on my shelves and wedded in my thought.

—IK. MARVEL.



JAPANESE WALNUT (*Juglans Sieboldiana*). SPRAY ½ NATURAL SIZE. INDIVIDUAL NUTS FULL SIZE.

The American Garden.

Vol. XI. DECEMBER, 1890. No. 12.

A·CHRISTMAS ROSE

BY CHARLES BARNARD

CHAPTER I.

THE Black Ridge stage rattled down the last stony hill in a cloud of choking **dust.** Ten minutes more and the long weary ride would end at the village store. It was a hot July day, and yet every one of the stiff leather sides of the long wagon were down. They called it the stage. It was really only a three-seat covered wagon with two horses.

On either side of the rough road were tall, blasted stumps of pines—the giants of the primeval forests—half lost in the scrubby second growth of timber. Rough mountains on every side—not a dwelling or sign of civilization in sight. The driver, old Rube Snow, had nothing to say. His thoughts were on the frame house in the village—upon his child. The solitary passenger inside had not spoken a word since they left the railroad—nine miles behind.

The village store was the general meeting-place of the neighborhood. Here the citizens met by common consent to settle the affairs of the nation—and the village. In winter they sat around the stove; in summer sat on the piazza steps.

"Suppose its likely the new school teacher 'll come to-day or to-morrow or next week or some other time."

"Shouldn't wonder a mite, Deacon, if 'twas to-day."

"Sorter strange, Retire, to send to Bostin for a school teacher, and then again I dunno 's 'tis. All-fired smart folks to Bostin !"

Retire Hopkins and Deacon Remember Silloway were the village seniors. Retire was school committeeman and Deacon Silloway was reported rich—for Black Ridge. As he never knew his own mind, he was "much looked up to" as a person of great caution and moral stability.

"Guess the new teacher will have a hefty row to hoe. Those big boys up ''Tater Hill' 's broke up

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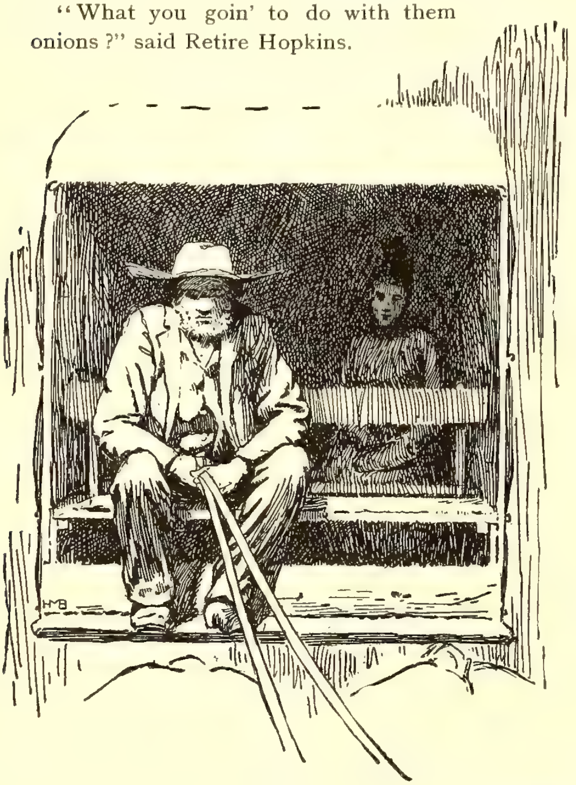
the school twice and druv the teacher off. Boys has considerable backslid since we were boys, Retire. Then again I dunno 's they has. Boys will be boys—and here they come now. Comin' to get a peek at the new teacher from Bostin."

Seven over-grown boys came stumbling along the dusty road. In front strode Sam'l Lovewell, tall, gaunt, with raw hands and long wrists that stuck far out beyond his jacket sleeves.

"Now, boys," said the Deacon, "don't you be cuttin' up any of your didos."

"Oh, we aint going to do nothin'. We want to see the new teacher from Bostin."

"What you goin' to do with them onions?" said Retire Hopkins.



"The Driver, Old Rube Snow, Had Nothing to Say."

"Nothin'. Mebby the teacher likes onions."

Retire Hopkins put on his glasses and inspected the rough-looking company of cubs.

"Now, boys, give the teacher a chance, will ye? Don't you be cutting up 'fore school begins. What you got onions and cabbage for? What on airth you going to do with them eggs?"

"Nothin'," said Sam'l.

For some reason this seemed to be very amusing to the boys. The Deacon lifted a warning finger and began to speak, but was cut short by the sudden arrival of the stage. At the same instant two or three girls and women came along as if to witness the one event of the day—the arrival of the mail and express.

Rube Snow pulled up his dust-covered horses, and twisting the reins around his whip, began to hand out parcels and packages directed to sundry persons in the village. Thankful Sloan, the funny little postmistress and express agent, came out of the store and took the mail bag and the express packages, piling them upon her arm.

"That all, Rube?"

"No; here's a box. It's a leetle hefty for you, Thankful. Here, Sam'l Lovewell, just you lend me a hand!"

Rube pulled out a long box and pushed it over the wheel. The entire population gathered near to see what it could be. The paper cover caught on the side of the wagon and came off. It was a box of plants, some in full flower. Sam'l Lovewell looked at it in admiration, and was just a little proud of his splendid burden. Flowers! every one crowded around to see them.

"I declare," said the Deacon, "if them aint the first posies ever came to Black Ridge. 'Bout as pretty as any ever I see—anyways as pretty as some I've seen."

"Who be they for?" said Retire.

"They belongs to a passenger, and I guess if I get down I'll let the passenger get out."

"Did you bring the new teacher, Rube?"

"Shouldn't wonder a mite if I did."

A wild shout rose from the boys, and they ranged themselved in a double row on each side of the stage door. There was a sudden display of eggs, onions and stale cabbage in their grimy hands.

"Boys! boys! Don't you cut up!"

The women and girls retreated into the store.

"What a pity! Somebody orter tell 'em to behave. Those 'Tater Hill boys is a disgrace to the village"

Rube held the door of the stage fast.

"Now, look a'here, Sam'l Love'll, you'll be repentin' your foolin' in a minute."

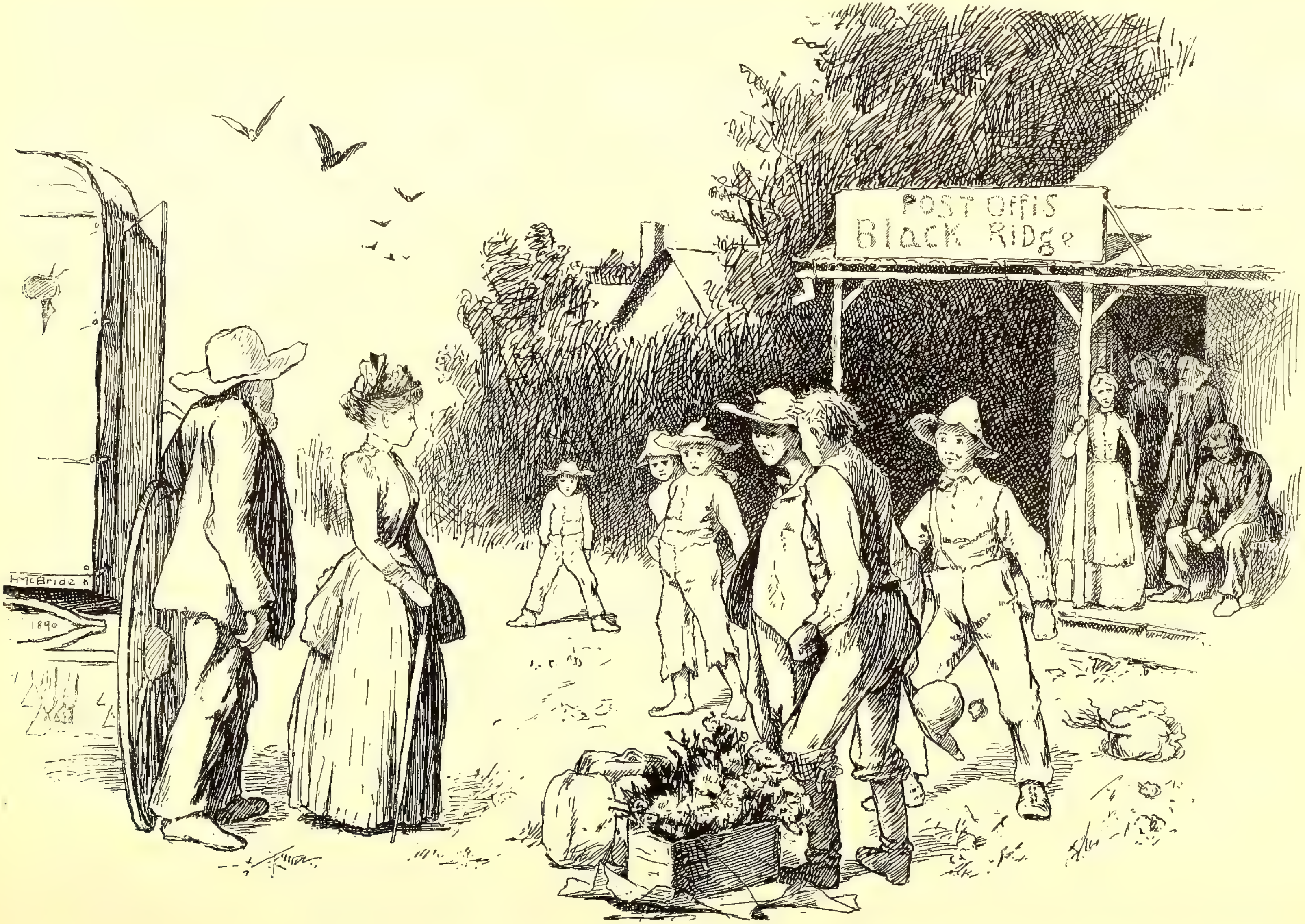
"Oh! shut up, Rube, and open the door."

Thankful Sloan had come out on the piazza in alarm.

"I shouldn't wonder a mite if the teacher got the best of you, Sam'l. Just you give him a chance to get down before you begin any of your didos."

"Oh! Give the loon a chance, boys. Wait till he gets down."

Rube slowly opened the stage door, and with a graceful little jump there landed in the middle of


POST OFFIS
Black Ridge
H McBride
1890

Arrival of the Schoolmarm: "Landed in the Middle of a Group of raw Savages."

the group of rural savages a young girl, charming, winsome, beautiful.

CHAPTER II.

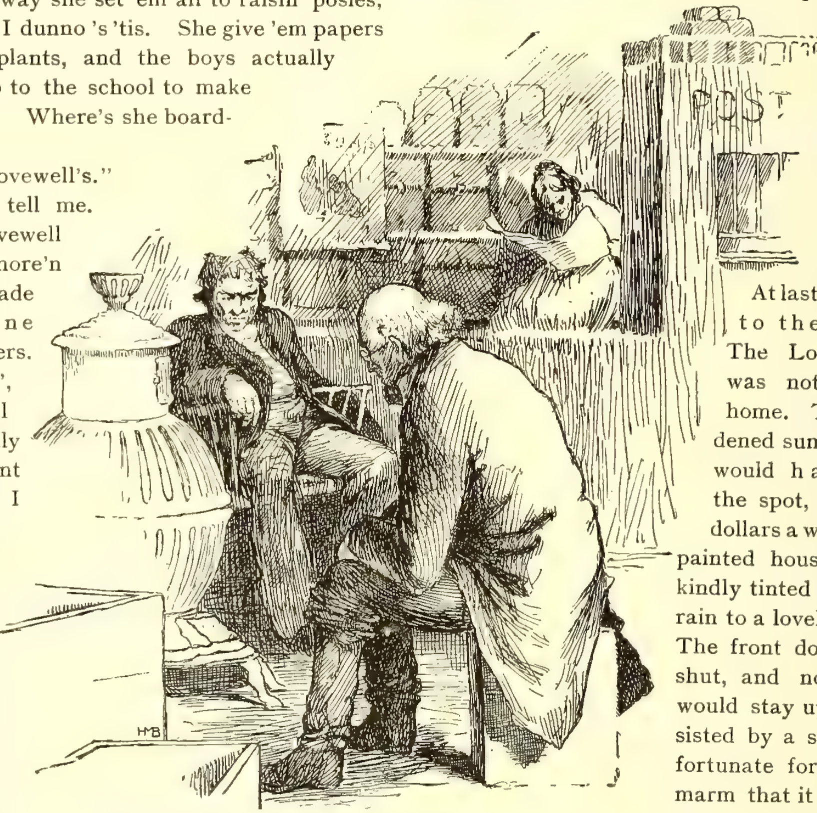
"Mebby you 're right, Retire. I never would have believed it."

"I always said, Deacon, there was more flies ketched with 'lasses' 'n vinegar. That little Bostin woman just tamed those 'Tater Hill boys in no time. It's the best school in this deestrict now."

"Curus, the way she set 'em all to raisin' posies, and then again I dunno 's 'tis. She give 'em papers o' seeds and plants, and the boys actually wheeled dirt up to the school to make a garden there. Where's she boardin' now?"

"To the Lovewell's."

"You don't tell me. Why, the Lovewell home ain't more'n fit for high-grade cows, let alone human critters. Mebby 'tis, tho', for I see Sam'l Lovewell actually paintin' the front door last time I druv by."



"The Worthies were Seated Around the Stove in the Store."

The deacon and the school committeeman were getting new light. The schoolmarm from Boston had been a revelation to Black Ridge. Her looks, her clothes, her ways and manners had been the theme for every tongue in the place. Chief among her traits was the love of flowers—something they could not understand.

"Posies are thicker 'n flys in August in all the fields," said Thankful Sloan, "and here I've been makin' out money orders to send to Bostin for seeds and things." She repeated this to every one who came to the post office. "And as for the 'Tater Hill school'us, it is a sight to behold."

There was no hotel in the entire township, and only one boarding house, and that was six miles from Black Ridge. So it happened that the people took the burden of providing a home for the school teacher upon themselves in turn. She "boarded 'round." She began at Deacon Silloway's, and then went to Retire Hopkins' house, staying two weeks at each place. Then she went on from house to house in turn, staying two Sundays in each place. There was a certain beautiful justice in this boarding 'round idea. The different families all picked up a few dollars in turn, and into each home came the gracious presence of a sweet and pretty girl. She entered twice a month into a new home, and left it better than she found it.

At last she had come to the Lovewell's. The Lovewell place was not a cheerful home. The most hardened summer boarder would have avoided the spot, even at four dollars a week. The unpainted house had been kindly tinted by wind and rain to a lovely slate color. The front door would not shut, and not a window would stay up, unless assisted by a stick. It was fortunate for the schoolmarm that it was August. The little attic, where they bestowed her, in winter would have been colder than the north side of a January tombstone. Just now it was quite comfortable, for the breeze simply walked right through it, leaving the sweet smell of the woods behind it by way of a card.

To Sam'l the arrival of the schoolmarm had been the first great event of his life. When she stepped down from the stage that afternoon, he dropped the wretched onion he held in his hand. It seemed to him as if he had dropped something out of his life. For the first time he felt ashamed—mighty good thing for him, by the way; for the first time he seemed to look up, and not down. She seemed a superior being, and yet in some vague way he felt he was like her. The survival of some instinct from some gentle mother's mother led him to pull off his straw hat in her presence. He put it right on again when one of the boys laughed, and yet he wanted to thrash the boy on the spot.

Sam'l had no thought of attending school. He might go the first day—to see the fun. He intended to lead the sport in making the "school 'us too hot for the teacher." And now he was the teacher's willing slave! He had attended school the very first day, and by his mere big fighting presence kept order for the first hour. After that the school kept the most beautiful good order of its own sweet boy and girl will. It was captured—by a young woman—and enjoyed its captivity.

Sam'l never missed a day at school. He arose before light to do his chores, and sat up late over new and wonderful books and papers the teacher had loaned to him. He counted the weeks that she boarded 'round at the neighbors. Now, at last, she was to be under the same roof with him, to meet at the same table.

In a sheltered corner of the little border, next the house and close under one of the windows, he had planted a thorny bush. She had given him the plant the first day of school.

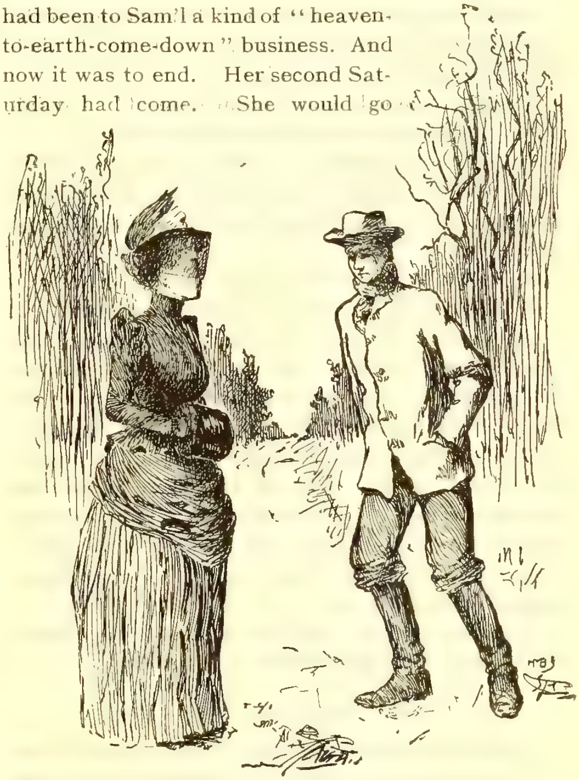
"Plant it for me somewhere near your home. If you cultivate it and bring me a flower, I will, in turn, give you anything you ask."

He had taken the plant in its pot with awkward tenderness. It must be something new and strange if she brought it from the city. He mumbled some kind of thanks (never having thanked any one before) and sheepishly bore it out of the school among all the boys and girls. One boy laughed and got a whacking kick on the shins that he remembered with tears and arnica for a week. If the teacher had given anyone else a plant that first day, it would have been different. To be selected for such an honor almost overwhelmed the big boy. The fact that the next day she gave others more of the treasures did not seem to lesson his glory. He had received the first gift and a promise of reward.

Those few weeks of "summer school" were full of discoveries for Sam'l. He discovered how little he knew. He had once been just a little proud of his want of "book knowledge." Now it seemed as if he was scarcely six years old—and nearly six feet tall at that. He could not go to school again. It was his last chance, and the thought seemed to give him a kind of terror, as if his own ignorance somehow kept him far away from her. He discovered, moreover, that he was not a big boy. He discovered something else, but he couldn't talk about it, at least not now.

This last led to some remarkable results. He bought a pocket knife with a blade for the finger nails. He bothered his mother dreadfully about his clothes. He even begged his father for a paint brush and actually painted the front door a fine tone of green. He tended that plant with infinite care, and the thing grew and grew, but showed no signs of bud or flower.

The two weeks she had been at the Lovewell farm had been to Sam'l a kind of "heaven-to-earth-come-down" business. And now it was to end. Her second Saturday had come. She would go "boarding 'round" to some other house, and his father had insisted that Sam'l leave school at once, and attend to the fall plowing. Queer man, that father. He wanted his fields plowed that they might remain fallow all winter, and was quite willing Sam'l should remain fallow, too! She came out once more to inspect the plant under the living-room window.



"I MEANT TO HAVE GIVEN IT TO YOU."

"I've tended her up 's well 's I could—new soil and liquid manure same as in the book you lent me. What 'd you call the plant?"

"Why, Samuel, it's a rose—a white rose. I'm sorry it has not bloomed."

"So 'm I. I wanted to give you the flower 'fore school stopped. Don't look now as if it would bloom 'fore Christmas."

"It will hardly bloom then. It is a tender rose, and will not stand freezing weather—that is, unless it is protected."

"Protected! what 's that?"

"Why, glass. If it had glass over it—like a little greenhouse—it is possible it might bloom."

He had never seen a greenhouse. In one of the papers she had loaned him there were pictures of greenhouses, but they had seemed impossible structures, and he did not quite believe they really existed.

"She 's got to bloom if I have to make one of the glass things. Don't see how I can do it, tho'. Greenhouses are so awful big!"

"Why, Samuel, you are in earnest! I didn't know you had it in you to be so earnest."

"Oh! I can do things—ef I see the good o' doin' 'em. Don't suppose you 've got any book to tell how to make a little glass thing big enough to cover the rose?"

"Perhaps a cold-frame would do it."

"I 'm powerful anxious to make her bloom."

He wanted to say why, but dared not. She wouldn't understand. He stood there in awkward silence before this woman—his inspiration and his hope. If the rose would only bloom it might speak for him. He looked forlornly off upon the mountains 'round about. Already they were brilliant in October flames. He looked at his bare and dreary home—poverty stricken and desolate. She stood there in wonderful raiment, and with a faint blush upon her bright face.

"I guess I 'll have to bust my tin savings bank. She 's got to bloom—before Christmas."

CHAPTER III.

"Tell you, Retire Hopkins, it's the softest winter we 've had these twenty year. Anyways, it's pretty near as soft as any you ever see. Here 'tis 24th day of December and not a mite of snow."

"And no great frost to speak of. Farmer Lovewell's got his chance this year. He 's always saying there aint no time to do fall work. Guess he 's had four months fallish weather this year, and no time he couldn't plow."

The worthies were seated 'round the stove in the store discussing the mild winter. Thankful Sloan sat in her little box of a post-office reading a Christmas number of some magazine she had cleverly pulled out of its wrapper.

"It's an old sayin'," she piped up, "a green Christmas makes a rich graveyard."

She didn't say she had just read it, and it passed for native wisdom.

"Ef I didn't forget all 'bout it!" said the Deacon; "to-morrow is Christmas. We never made so great of those heathen holidays like hollowe'en and those sort o' days up to the meeting-house, but I do believe the schoolmarm's going to have some kind of a meeting. I see Sam'l Lovewell totin' a young saplin' spruce up there yesterday."

"Guess it's the fust Christmas tree ever was sot up in Black Ridge. Be your folks going?"

"They's been invited, but I never favored such goin's on, anyways."

"S'pose you 'll be there, Deacon," piped up Thankful.

"Yes. I told mother I would—just to please her."

"Guess the hull town will be there 'cept Rube Snow's folks. His gal 's been ailin' these six months and yesterday she died. I suspect they 'll have the buryin' to-morrer for fear the ground might freeze up."

Christmas arrived at Black Ridge. It was a wonderful day—mild, bright and as beautiful as a Sunday morning in June. All the Ridge had heard of the Christmas tree at the 'Tater Hill school house. Every one knew also of the sorrow that dwelt in the stage-driver's little frame house on the back road.

Thankful Sloan said it seemed "Sorter strange to have a funeral in the village and a "time" going on up to 'Tater Hill school house same evening."

Retire Hopkins said "It wasn't intended to be unseemly."

"It just come that way, and he didn't see how the schoolmarm could give up the time she had planned for the boys and girls on account of Rube Snow's second girl being buried that day."

Sam'l Lovewell had seen the sun rise with mingled dread and hope. A second-hand window sash bought at the next village, four miles away, a few boards and nails, and natural gumption had done it. Over the white rose had been built a cold-frame. He had banked stable manure against it. He had watched it day and night. He had covered it at night with hay, he had aired it on sunny days. At last, on the day before Christmas, a single bud had shown the tips of white petals. If to-day were sunny it might bloom. He went to look at it after doing his chores. It had not changed since the day before. Perhaps as the sun rose higher, and the tiny frame grew warm, the bud would swell into glorious beauty. Almost without knowing it Sam'l had become a florist.

About eleven o'clock, while Sam'l was in the barn doing up some odd jobs so that he might be free to go to the Christmas tree that evening, his mother came to the door and said that Rube Snow wanted to see him.

Sam'l came out of the house and found the stage driver peering through the glass of the little cold frame.

"I don't see, Sam'l, how you did it! I heard tell you was raising posies, but I didn't 'spect anything like that."

Sam'l lifted the old window sash.

The rose had bloomed.

The two men stood looking at the beautiful white bud in a kind of awesome wonder. To the older man it seemed little short of magic. It was the most beautiful thing he had ever seen. To the younger man it was the crowning of all his labors. The Christmas rose had bloomed. He could give it to her—and he could ask that one favor, that one magnificent reward.

"My 'Manthy would have loved to see that. She 's to be buried to-day, and mother said I was to ask if you could give me that flower—just to put in her hand when we lay her away?"

He managed to say this in some sort of broken fashion. Not in those words—yet Sam'l understood. Rube Snow wanted his rose—for his dead child's funeral. Sam'l knew it would be the only flower upon the little coffin. There were no other roses within a hundred miles—and it was Christmas day.

'Manthy Snow had never attended school since the new teacher came. Still, she was regarded as one of the pupils. It was not strange, therefore, that the schoolmarm should appear at the little frame house among the mourners. She wore a black dress and black kid gloves (the only pair in town) and the dark costume seemed to enhance her brilliant beauty. She seemed altogether of other form and being from the plain folks gathered in seemly silence 'round the door. The tall, gaunt men and heavy toil-worn women made way that she might pass into the darkened "fore room" where lay the child asleep. She bent over the quiet face as if to kiss it, and saw in the waxen fingers a white rose bud—the Christmas rose.

The minister read in a dreary voice, and then the mournful "Balerma" quavered on the air of the darkened house. It seemed all very sad, and yet there was in every heart a sense of gratitude and comfort. The child had gone home in peace with a Christmas rose in its hand.

The schoolmarm walked along the dry grey road under the bare trees outlined against the intense blue of the Christmas sky. She had just left the little procession winding up the hills towards the old graveyard on the mountain side. It was put there for safety against the Indians in the old days. Presently she heard a quick step on the brown leaves along the roadside. It was Samuel.

"I meant to have given it to you."

"Yes, Samuel, I know it. You have given it to me in giving it to her."

He walked on in silence for some moments and then he stammered out:

"You said you would give me something—if I brought you the rose."

"Did I? Well, I'd forgotten. What shall it be—a book?"

Samuel never asked her. He could not—not then. She never knew what he would ask. Nor does any man or woman. It was locked up in the young man's heart. What did it matter? The Christmas rose had bloomed. It is character that counts after all!

THE JAPANESE WALNUT. (*Juglans Sieboldiana*, Maxim.)

Fig. 1, Frontispiece.

THE JAPANESE walnut, which is now attracting some attention, appears to have been introduced into the United States about 25 years ago. The oldest trees are at Tower House, Shasta county, California, the property of Charles Camden. There are two trees. "They bore nuts at eight years of age," Mr. Camden writes. "The trees grow very thriftily and are handsome in shape, and are very full and regular bearers." The illustration is made from specimens from these trees.

Some 15 years ago Mr. Camden sent trees to General Bidwell, at Rancho Chico, and they are now bearing. These and the two original trees are the only ones yet fruiting in this country. The tree is now offered by some Eastern nurserymen, and we shall soon hope to know something definite as to its hardiness and capabilities. The species grows in Northern Japan and is said to be as hardy as an oak.

Juglans Sieboldiana is closely allied to *J. Mandchourica*, another species of Eastern Asia, though it is not recorded as a cultivated plant in Japan. Dr. Maximowicz, the author of both species, says that he has often seen them growing and knows of no good distinction between them, except the characters of the nuts. *J. Mandchourica* has oblong and ridged nuts, while *J. Sieboldiana* should have short and smooth nuts. In shape, the nuts of the specimens figured (see frontispiece) are very like those of *J. Mandchourica*, but their smoothness places them in the other species. It is very likely, as Dr. Sereno Watson suggests to me, that the two species run together, and that the California trees represent a variation towards *J. Mandchourica*.

The species might be called with better propriety the Japanese butternut. The nuts are borne in long clusters which often hold from 15 to 20 specimens. Nuts are shown natural size, with the husk on and removed, in the illustration. The shell is thinner than that of our butternut, and the kernel is sweet and rich, much as in our species. The tree itself is attractive. It appears to be one of the most promising of recent acquisitions.

According to Luther Burbank, "the species is of easy culture. It accommodates itself to the same soils as its congeners, and grows with great vigor. It is easily grafted by approach upon our common walnut [English walnut ?], and its trunk retains the same dimensions as the stock ; but it is by seed that it should be multiplied. It reproduces itself perfectly true, and if the young plants remain bushy during the first years, the tree shoots afterwards, and, thanks to its rapid growth, promptly assumes large dimensions." Professor Wickson says, that the species first gained prominence in 1881, when the California State Horticultural Society referred the question of its botanical affinities to G. P. Rixford. R. J. Trumbull & Co., California nurserymen, first catalogued it. L. H. B.

* * *

> "*True Taste is an excellent economist. She confines her choice to few objects, and delights to produce great effects by small means ; while False Taste is forever sighing after the new and rare ; and reminds us of the scholar of Appelles, who, not being able to paint his Helen beautiful, determined to make her fine.*"

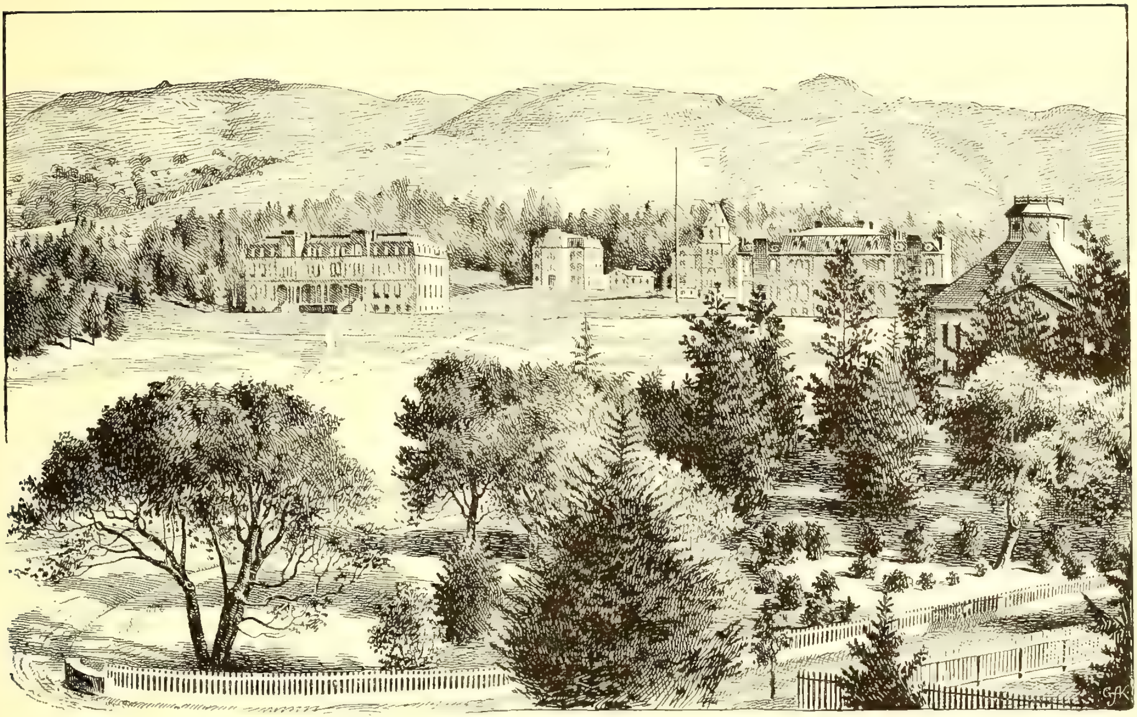


FIG. 1. UNIVERSITY OF CALIFORNIA.

THE GARDENS OF THE UNIVERSITY OF CALIFORNIA.

FROM the summit of the Contra Costa range, 850 feet above the sea level, there is afforded an extensive view of the two hundred acres comprising the grounds of the University of California, situated in the classic town of Berkeley, on the borders of San Francisco Bay.

The marine scenery, which furnishes so effective a back-ground for this panorama, is worthy of more than passing mention. Upon the western horizon, ten or twelve miles distant, is seen the celebrated Golden Gate, through which gallant ocean steamers plough their way to the boundless Pacific; and midway in the channel lies the rocky islet upon which is stationed the staunch little fortress of Alcatraz; flanked on the north by what is mysteriously known as Angel Island, and on the south by that which bears the less euphonious title of Goat Island.

Behind the former rises the scarred, weather-beaten peak of old Mt. Tamalpais, guarding the pretty suburban homes of Sancelito and San Rafael; and beyond the latter appear the smoke enveloped, roof crowded hills of the great metropolis, its harbor bristling with the masts of many foreign nations. White sails glancing in and out among the islands, and long flights of wandering sea gulls serve to complete the pleasing picture.

The heavy fogs and high trade winds, which sweep with more or less regularity over this region, are greatly modified before reaching the opposite shores. Especially is this true of the site under consideration; the main college buildings occupying a terrace three hundred feet above, and three miles distant from the shore. The average temperature varies from about 30° in winter, to 65° or 70° in summer, the hottest day not exceeding 90°, and the mercury seldom falling below freezing point. The annual rain-fall is estimated at about 25 inches.

Before the temples of learning stretches the wide campus, of brightest emerald from November to June or July; the recreation-ground not only of the students, but of numerous grey-squirrels, which bound nimbly over its wide expanse, to disappear among the wealth of blazing eschscholtzias, carpeting the adjoining meadows. Dotted at intervals upon the park-like lawns are ancient live-oaks (*Quercus agrifolia*), which are indigenous to this locality.

The foothills are utilized in the culture of foreign timber-trees, the most promising being the Australian gums, especially the eucalyptus, a hardy, rapid grower. Beside these are the English oak (*Quercus penduncu lata*), and several species of acacia.

Along the banks of a picturesque stream called Strawberry Creek, which marks the southern boundary of the gardens, flourish the buck-eye, the laurel or bay-tree, the sturdy madrono, the mountain lilac, the brook-willow, and the alder. Rustic bridges conduct the rambler to shady sequestered nooks, where, surrounded by trailing wild honeysuckle, blackberry vines and periwinkle, and greeted by the grateful aroma of worm-wood, sweet-ferns, and yerba-buena, it is easy to imagine one's self in the heart of the country in its primal condition, though really but a few steps from this western seat of learning.

The experiment gardens, established twenty years ago, shortly after the organization of the University, contain over six hundred specimens of trees and shrubs, which remain at all seasons in the open air, with the exception of a few fragile exotics, which are, in winter, temporarily transferred to the conservatories. Among large ornamental trees are noticed the great, blossom-laden magnolia (*Magnolia grandiflora*), which grows luxuriantly with little or no cultivation ; the graceful, drooping, Chilian pepper-tree (*Schinus molle*), the rice-paper tree (*Fatsia papyrifera*), the osier-willow, the Port Oxford cedar, Norfolk Island pine, the funeral cypress, and the strawberry-tree ; all these in that vigorous growing condition which denotes not only a favorable situation but intelligent care.

Ranks of stalwart evergreens fringe the outskirts of the grounds, forming considerable wind-breaks. Much success has been met with in the raising of coniferous trees, such as the majestic Douglas spruce, the towering sugar pine, and the yellow pine of the vicinity of Mt. Shasta, the white cedar of Oregon, the redwood, the digger-pine of Napa Valley (the nuts of which were formerly used as food by the Digger Indians), the California big-tree and the California cedar. Of these some are particularly notable for their stately beauty.

Following the windings of the broad, smooth drive-ways, many pleasing features attract the eye. The breeze rustles gently through the stiff leaves of stately dracænas or dragon-palms, from the islands of the Pacific, while a greater tropical effect is produced by long avenues of beautiful fruit-laden fan-palms. Other members of the palm-family are seen, as the cabbage-palm of the Southern States, the Chinese fan-palm (our well-known *Latania Borbonica*), the date-palm, and the deep green *Chamærops excelsa*, borne company by the Abyssinian and Chinese bananas, the stately screw-pine and the distinct Spanish bayonet.

Tall hedges of mock-orange, laurestinus or Monterey cypress, form a rich setting for clumps of gay-colored canna, or Indian-shot, Scotch broom, hydrangea bushes and Chinese abutilon. The landscape is further diversified by beds of brilliant annuals and perennials, which are the haunt of numerous rainbow-hued humming-birds, combining the beauties of the rich flora and fauna of the country.

Choice roses, geraniums, and fuchsias here attain their highest perfection, regardless, for the most part of fog, frost, hail, rain or wind ; even raising their dainty heads boldly from the soft blanket of snow, in the light snow-storms with which this section of California has two or three times been favored. Eastern growers can scarcely realize the luxuriant beauty of their commonest dwarf bedding plants in this kindly climate, where such old friends seem to lose all their characteristics of small habit.

The so-called Garden of Economic Plants, occupying an area of nearly two acres, near the western entrance to the grounds, was set apart some twelve years since for experiments with useful trees and plants native to foreign countries. The soil is of fertile adobe, and the spot is sheltered by thick shrubbery on the windward side ; so the care and watchfulness of the horticulturist have met with gratifying returns. The enclosure is shaped somewhat like a horse-shoe, that portion which represents the outer curve being bordered with clumps of the handsome New Zealand flax the long fibrous leaves of which are sold to vineyardists for securing their vines to stakes.

Within this is planted a row of the delicate European esparto grass (*Stipa tenacissima*), used on the continent in the manufacture of thread, ropes, baskets, mats, etc., and to some extent in paper and carpet-making ; it is probably that this grass will show valuable characteristics here.

Among other textile plants are to be found the jute, the ramie, or Chinese grass-cloth plant, the common flax and the century plant, all of which are receiving careful attention in view of their economic possibilities. The first two especially give promise for the far western farmer.

Of the grass family, the Chinese species of bamboo from Choo Foo produces the best and longest canes. Next to this is the Himalayan species, and then come the Indian and the Los Angeles bamboos, all interesting and valuable, and all growing with great freedom and vigor, though so far from their native habitats.

The Japanese camphor (*Camphora officinarum*) is a noble looking tree, reaching the height of twelve or fifteen feet. Mulberries prosper luxuriantly, especially *Morus Japonica*, or Japanese mulberry, and Downing's everbearing.

Here the carob or St. John's bread (*Ceratonia siliqua*), from the distant Mediterranean, unfolds its light green leaflets in the sunshine. This tree is remarkable for resisting drought, and its large pods furnish excellent fodder for horses and cattle.

Swarms of dusty bees hover over the tall stalks of the honey-plant (*Echinops sphærocephalus*), hard by the blooming artichokes or cynaras, and sparrows hop into the shade of the pistachio-tree, the trunk of which exudes, under certain conditions, a gum from which turpentine is made.

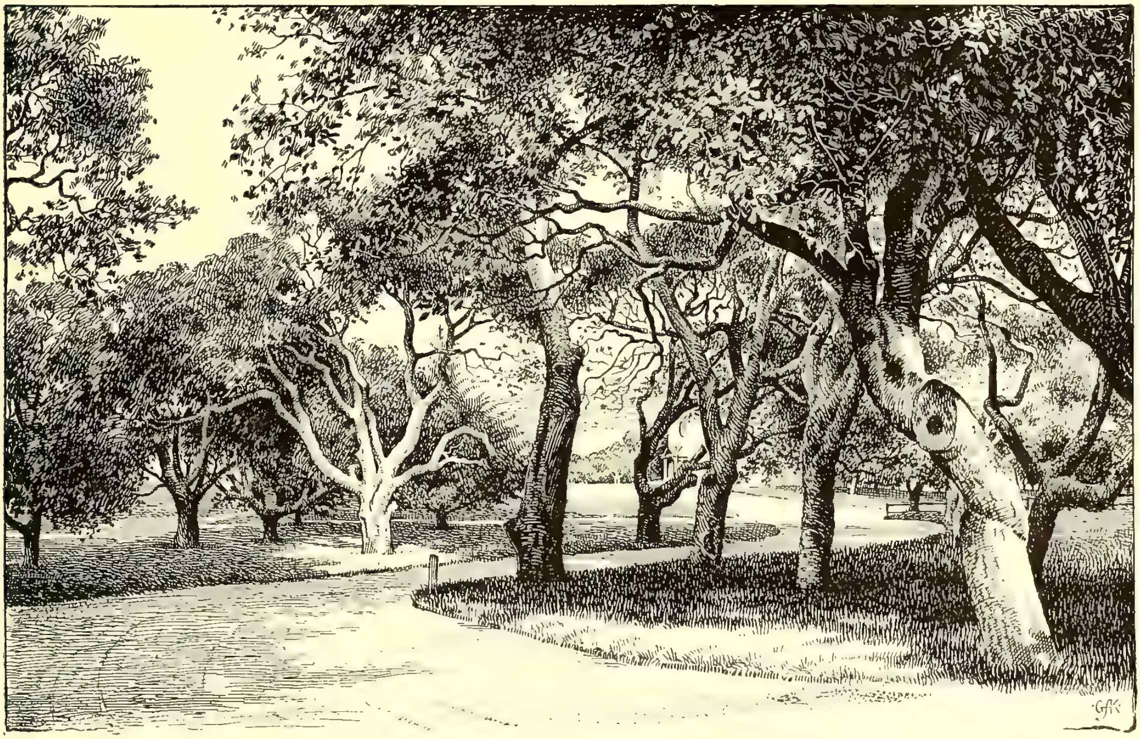


FIG. 2. THE BERKELEY OAKS.

Other economic plants are the cinnamon (*Cinnamomum glaucum*), the caper-bush (*Capparis spinosa*), the coffee-tree, the Chinese tea-plant, and the red pepper.

The air is fragrant with the odors of thyme, bergamot, sweet marjoram, sage, balm, lavender, tansy, and other aromatic herbs, which occupy a bed, in close proximity to their medicinal cousins, the chamomile, hemlock, ginger, fox-glove, liquorice, tobacco, borage, mullein, and golden-rod.

This enclosure also contains a plot of over a hundred varieties of wild grape vines, from America, Asia, Italy, Hungary, Austria, France, and Burgundy. The summer heat is not sufficient to thoroughly ripen the fruit, but the vines are raised for experiments in grafting. As yet, the wily phylloxera has not attacked this section, although it has destroyed vines in the immediate vicinity. In connection with the Experiment Station Building is a wine-cellar, where on a small scale, wines are manufactured, and contributed samples chemically tested.

Five of the twenty-five acres, comprising the agricultural grounds, are devoted to the orchards, which contain about one hundred and fifty varieties each of apples and pears, one hundred of peaches, seventy of plums, forty of cherries, and twenty-five of apricots. A few small fruits are also raised, beside certain kinds of vegetables. Here are also to be found thirty varieties of the olive.

Two or three hundred feet of fencing are concealed by a dozen or so trained pear-trees, among which are two kinds of Bartletts, one of the Winter Nelis, and one of the Seckel. The branches of each tree extend perhaps fifteen feet on either side of the main stem.

The scale-bug has been fought, thus far, with whale-oil soap and hydrocyanic acid; but a more valuable enemy has lately been discovered in the shape of the Australian lady-bug, which has been imported into the citrous orchards of Southern California, with eminent success.

In the generous spaces set apart for cereals, and for grasses and clovers, are found nearly 300 varieties of the former, and 70 of the other two.

In the Botanic Museum, beside a large collection of samples of cereals, are several thousand fine specimens of representative native and foreign trees and plants.

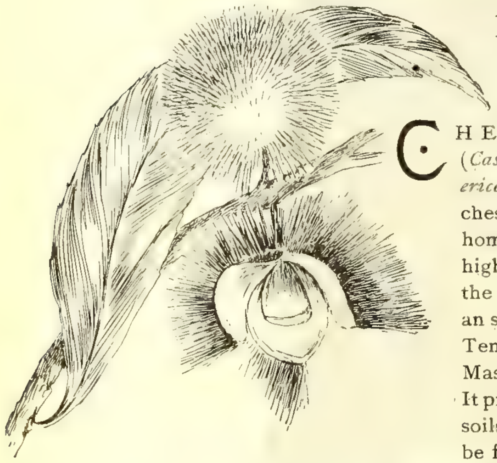
From the Agricultural Bureau, seeds and cuttings are gratuitously distributed to a limited number of applicants, for experimental purposes, the only proviso being reports as to their progress.

A visit to these grounds would amply repay not only the student of botany, but also the lover of the picturesque, and the seeker after relaxation; though in the case of the first mentioned, one trip would be found entirely inadequate for a thorough investigation of the numerous resources the natural attractions of the place affords.

Bertha F. Herrick

PROMISING WILD FRUITS—III.

MORE UNTOUCHED RESOURCES.



CHESTNUT (*Castanea Americana*). The chestnut is at home on the high lands of the Appalachian system, from Tennesssee to Massachusetts. It prefers sandy soils, but may be found on all lands which are high and rolling. Most prairie soils are unfavorable to it. The general northern limit of its possible cultivation extends into southern Wisconsin and Michigan, northern New York and southern Vermont, but this line varies according to the character of the locality, the nature of the soil having an especially marked effect upon the hardiness of the chestnut. Where the climate is not too severe, the seedlings may be killed to the ground the first one or two winters, but afterward be sufficiently hardy to endure the exposure. Mulching during winter for the first year or two is useful to protect the young trees.

The improved Spanish varieties of the chestnut which have been introduced into this country from time to time are rather less hardy than the native species, and are somewhat inferior in quality. In southern Europe the chestnut forms an important article of food. In Pliny's time six cultivated varieties were known, and in 1865 thirty varieties were catalogued. In this country, superior varieties among the native species are not rare, and considerable attention is now being given to the grafting of these and foreign varieties upon the common chestnut. Thousands of acres of rocky mountain land exist in the eastern United States, to which the chestnut is peculiarly adapted, and on which hardly anything else of value will grow. The conversion of these barren mountains into valuable chestnut orchards is a work well worthy of attention. A serious drawback to the profitable cultivation of the chestnut is the liability of the nuts to become wormy, especially at the south. A remedy for this evil is greatly needed.

Chinquapin (*Castanea pumila*). This is a small tree or shrub found mainly in the southern states, growing usually ten or twelve feet high, or in favorable localities sometimes reaching forty feet. It is well adapted to sterile soils, and on this account it has been introduced upon certain arid plains in France and Germany, where it has been found to thrive better than any other shrub or tree.

The fruits, which are produced singly in the burs, are smaller than chestnuts, and of better flavor, but even more subject to the attack of the worm. Scalding is a good remedy for worms, both in chinquapins and chestnuts.

A dwarf variety of chinquapin is known, which on poor soils bears fruit when no more than a foot in height.

Black Cherry (*Prunus serotina*). This is the most abundant wild cherry of the United States, occurring mainly east of the Mississippi, where it is found from Florida to the Great Lakes, forming in the Ohio Valley a magnificent forest tree, but becoming reduced almost to a shrub on our northern borders. The ease with which it is grown, and its uniform productiveness, recommend it to the attention of improvers of our wild fruits. Although hardly eatable in its natural state, the fruit is probably quite as susceptible of improvement as many others. Its variability in different soils and climates would indicate this. On sandy "oak openings" in central Michigan the fruit is larger and better in quality than on heavy timbered lands in the same region. J. T. Allen of Nebraska, and Chas. W. Garfield of Michigan, have observed an improvement in the size and quality of its fruit under cultivation.

Although easily modified by surrounding conditions, this fruit (and the same may be said of other cherries) does not often produce distinct varieties. D. L.

Adair of Kentucky, however, discovered many years ago a spontaneous variety of the black cherry, with fruit three times as large as the average, entirely devoid of all bitterness and astringency, and which he considered equal in flavor to the best cultivated cherries. Enough, at least, is known of this cherry, so well adapted to a large portion of the continent, to render it well worthy the attention of the cultivator, especially when we remember the results which have been obtained from the bitter mazzard of Europe.

RED CHERRY (*Prunus Pennsylvanica*). This is a small tree, confined mainly to rocky woods in the northern portion of the United States, and extending far into British America. Its leaves are long and narrow, like those of the peach, and its light red fruit is borne in small sessile clusters, like that of cultivated cherries. In size, the fruit does not exceed that of the black cherry, and its flavor is usually sour and scarcely eatable.

The tree is now sometimes used as a hardy stock upon which to graft our cultivated cherries, and its chief value for fruit, should it become improved, will doubtless be for the extreme north.

"It exhibits in its seedlings," says Professor J. L. Budd, "a marked capacity for variation and improvement. A variety is in common cultivation in the south part of Benton county, Iowa, which bears heavy annual crops of fruit, which is considered quite excellent for culinary use."

SAND CHERRY (*Prunus pumila*). This is a dwarf trailing shrub, seldom over two feet high, found in greatest abundance on the sandy plains east of the Rocky Mountains, but occurring in favorable situations eastward to the Atlantic. It is found southward to Texas and northward to Lake Superior and Lake Champlain. In 1849 W. D. Whitney speaks of its occurrence in the Lake Superior region as follows: It "abounds on the light sands of the southern shore—a mere bush two or three feet high, heavily loaded in September with dark fruit, nearly as large and rich looking as that of the garden cherry, but unfortunately quite tasteless and insipid."

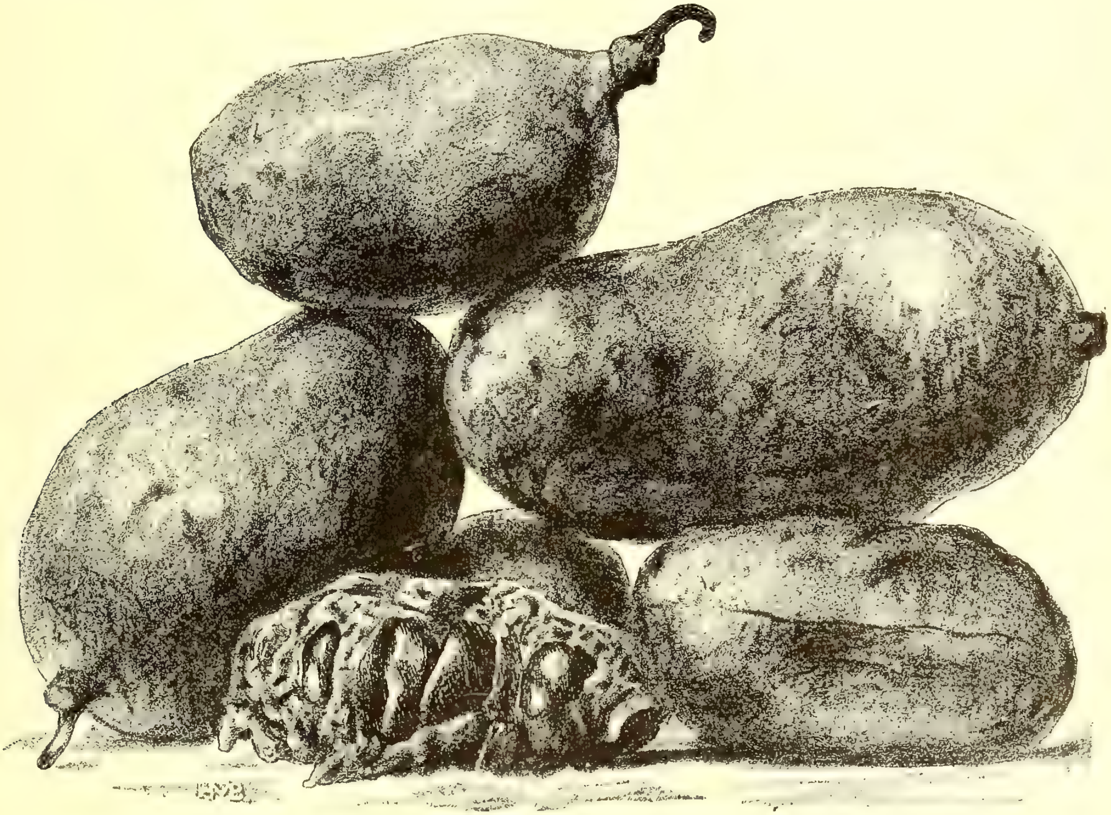


FIG. I. THE PAWPAW. (*Asimina triloba.*) ¾ NATURAL SIZE. (See page 714.)

Farther south it appears to be of better quality, and C. F. Wheeler speaks of its quality on the pine plains of Lower Michigan as "by no means unpleasant when fully ripe," and states that the fruit is used by the lumbermen as a welcome substitute for other and unobtainable fruit for sauce. Professor L. H. Bailey, who has studied this cherry in the same region, considers it surprising that even in its present state, it has not been introduced by the settlers into cultivation.

On the sand ridges at the southern extremity of Lake Michigan, Professor W. J. Beal and others have found this cherry growing to the height of eight or ten feet, with a stem two inches in diameter; but at a short distance back from the lake it assumes its usual low trailing form.

Professor C. E. Bessey, of Nebraska, states that a western form of this cherry, which is abundant on the more sandy plains of that state, is especially promising, and is occasionally cultivated, with indications of improvement. In regard to its quality he says: "In nearly every clump of bushes one may always find some which have but little, if any, astringency. I have frequently eaten the fresh cherries while rambling over the plains, and have often found specimens which were fully as palatable as many of the cultivated cherries."

The Utah Hybrid, said to have been produced by pollinating the wild "Potowattomie" plum with pollen of the sand cherry, has proved to be a valuable fruit for southern Utah, where the ordinary cherries do not thrive.

PAWPAW (*Asimina triloba*). (Fig. 1.) This fruit, though not extensively used in the wild state, is usually included among those worthy of efforts toward improvement. Dr. Asa Gray regarded it as promising great capabilities, and believed that by cultivation and selection for several generations it might approach in character the custard apple of the West Indies. A. S. Fuller considers the pawpaw as ranking high among our promising wild fruits, and suggests that attempts be made to improve its quality by crossing with some of the tropical fruits of the same family.

No extended effort seems ever to have been made toward the improvement of the pawpaw, though the tree is occasionally planted, generally for ornamental purposes. Dr. Darlington in his remarks on this fruit in his "Flora Cestrica," seems to convey the idea that its quality is improved by cultivation. Dr. J. P. Kirtland, a well known fruit grower of East Rockport, Ohio, now deceased, is reported to have at one time attempted the improvement of the pawpaw, but nothing can now be learned of the result.

The pawpaw, being entirely distinct in character from any other fruit of temperate climate, would doubtless find a ready market if its quality were improved to meet the popular taste. The small quantities brought to the markets of some of the eastern cities, mainly by negroes, are usually sold to persons of their own race, or to others who buy it as a curiosity; there are some who eagerly seek for it as a delicacy.

The tree is vigorous and healthy, of convenient size, bears young, is readily propagated by seeds and by sprouts from the running roots, and it is sufficiently variable to offer an opportunity for selection. The chief effort needed in the improvement of the pawpaw is in the direction of flavor.

In regard to its flavor there is a remarkable diversity of testimony which can hardly be accounted for wholly from difference in tastes, though, like many other fruits, the pawpaw is evidently much more palatable to some persons than to others. Many of the statements regarding its flavor, however, must be attributed to carelessness or imagination. The flavor has been compared by different persons to that of the pear, the banana, the pineapple, and even to stale dough! N. C. Meeker, a well known agricultural writer, regarded the fruit as worthless. Timothy Flint, in his work on the History and Geography of the Mississippi Valley, published in 1832, pronounces the pawpaw the prince of fruit-bearing shrubs. He says, "The pulp of the fruit resembles egg-custard in consistence and appearance. It has the same creamy feeling in the mouth, and unites the taste of eggs, cream, sugar and spice. It is a natural custard, too luscious for the relish of most people. The fruit is nutritious, and is a great resource to the savages. So many whimsical and unexpected tastes are compounded in it, that it is said that a person of the most hypochondriac temperament relaxes into a smile when he tastes the pawpaw for the first time." This is quite a contrast to the other opinion!

THE CLOUDBERRY (*Rubus Chamæmorus*). This useful little blackberry, which occurs throughout the arctic regions of both hemispheres, is found along our northern borders, and at interior points of high elevation. Williamson, in his history of Maine, says: "It grows on the sides of mountains or exposed and elevated grounds. The shrub bears a single berry on the top of the stem. In size and flavor it resembles a strawberry; having a greater, though pleasant, smartness, and making excellent preserves. Its color is at first scarlet, turning as it ripens to yellow. When eaten with sugar and cream it is delicious, and so cooling as to abate fevers. This fruit lasts about a month."

In more northern latitudes this fruit often occurs in great abundance, and forms a valuable article of diet. In Norway the fruit is protected by law, no one except the owner being allowed to gather more than he wishes to eat. Attempts have been made in Europe to introduce the fruit into cultivation, but they have been unsuccessful. In Scotland, where the fruit is native on the Grampian Hills, much has been written about it, and several prize essays on the subject may be found in the transactions of the Highland Society.

The popularity of this little blackberry may be inferred from the number of common names which it has received, including, besides the more common one above given, "Bake-apple" in Labrador; "Averon" or "Mountain Bramble" in England; and in Scandinavia, "Grapes of the North."

RUBUS LEUCODERMIS. This raspberry, which much resembles the black raspberries of the east, except in the color of its fruit, is found in the mountains of northern California, Oregon and Washington, and in a few localities in Utah and Arizona. The fruit is yellowish red, rather large, with a white bloom and an agreeable flavor. It does not seem to have yet been introduced into cultivation, but it appears worthy of attention for the purpose of extending the comparatively limited area to which the raspberries of the black-cap type are adapted.

A. A. CROZIER.

Michigan.

NOTES FROM A PACIFIC PEACH ORCHARD.

THE WAYS of fruit trees seem past finding out. Last year, on this farm, the Peen-to or Flat Chinese peaches were ripe first; this year all the "early tribe" of white-flesh peaches, such as Briggs' May, Waterloo and Alexander, have beaten the Peen-to by a fortnight. "Something in the season" says the old rancher, with the air of having settled the problem. "The Chinese peach tree 'curled' badly this spring," says some one else in an equally serene tone of conviction. But the Peen-to has always "curled" more or less, and yet usually leads the peach orchard in point of earliness. Then, too, a tree of Brice's Early that was sent to me by mail ten years ago, from the originator's own nursery, ripened its most excellent peaches several days ahead of the Alexander this year; usually it is a trifle later. This peach is of so high quality here that I wonder it is not more often planted, but it seldom appears in the catalogues, nor has it a place in Wickson's "California Fruits."

We have the old Purple Alberge, or Alberge Red, a peach that is here of remarkable quality, and a prime family favorite. Thirty-five years ago it was first grown on this farm, and a great many orchardists wanted buds, but hardly one has kept the variety, and yet it continues to thrive here, "curling" in bad seasons, and casting its fruit, but averaging about four crops out of five. The house-wife says that she must have her Alberge peaches to can, and so the orchard will never be without a dozen trees.

I have grown a Yellow Alberge from another source, a larger, lighter-colored and much less valuable fruit than the very dark yellow-fleshed peach that has been so long famous in this township. Thomas, in his "American Fruit Culturist," says of the Alberge: *Yellow Alberge* (Purple Alberge), size medium, roundish, suture distinct, passing half round; skin yellow, with a deep purplish-red cheek; flesh deep red at the stone, juicy, sweet, pleasant, of moderate flavor." Downing says it is an old French variety, and "of only second-rate flavor." In fact, none of the authorities give the Alberge a high rank.

The Purple Alberge, as grown here, ripens a week earlier than the variety sent from New Jersey as "Yellow Alberge;" it is very dark in color, almost black on the sunny side, and dull red on the other—"those black peaches of yours" is often the phrase men use in ordering them. The shape, size, and other details agree well enough with the description given by Thomas, but in point of flavor it is certain that this peach, as grown here, outranks any other of its season. Elsewhere it often fails to come up to the expectations of its growers, and it is not a market peach, being so different in appearance from the leading sorts. We probably have in this matter a case of complete adaptation of the variety to its environment, and its possibilities are thus more fully developed than elsewhere. The highest-flavored, most fragrant and luscious peach in the orchard, among a hundred or more sorts, is usually acknowledged by every visitor to be the Purple Alberge. If there is any particular moral, it is to keep a good thing when you find out its value.

There was a peach "sport" on this farm a good many years ago, that promised to be of enormous market value. The history of its failure to be permanent is perhaps worth the telling. In the early fifties, when everyone in California was trying to raise some fruit trees, being inspired by the huge profits of the business, every peach-pit was planted out, and often considered the most valuable result of an investment of a dollar in a small, sour, Sacramento river peach. Sometimes these seedlings were budded, and sometimes not, but buds of good sorts were worth ten cents apiece, and were hard to obtain even at that price. So the first lot of peach seedlings on the old farm was for the most part left to grow up into trees. One of them was particularly worthless and was one of the first to be budded over. The kind chosen was a forgotten California variety, originating in Alameda, called "Myers' Rareripe" and historically of importance because it was undoubtedly the first step on this coast towards several famous early seedlings.

After the Myers peach had been bearing for several years, a bough well up in the tree showed late fruit. No one cared, and the branch was broken by the weight long before the peaches ripened. A few years later a bud from the stub had grown out, and again bore fruit—a late white-flesh—very late indeed, and soon found to be of surpassing excellence. It was then named "October White," and largely disseminated by nurserymen, and planted in orchards.

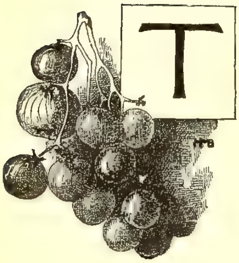
But not one of the descendants of the "October White" ever equalled the original tree for quality. The variety "ran out" almost immediately, ripened earlier and earlier, according as it was one or more removes from the parent stock, and had more and more of a "wild and woolly Western" aspect. In brief, it has "dropped out of sight," the old tree is dead, and the episode is forgotten by fruit-growers.

If there is any moral to this last incident, it is to the effect that nothing should ever be "disseminated" by a grower until it has been tested so long that its characteristics are fixed beyond a doubt. One of the indirect advantages of a law which permits a man to have the pleasure of paying twenty-five dollars or so for an "exclusive right" to sell a new variety, is that it willmake him amazingly careful to ascertain that he has a new variety to sell, before he parts with his hard-earned ducats, and so avoid innocently duping his neighbors. **Charles H. Shinn.**

Alameda Co., California.

TESTS OF CURRANTS.

SEEDLINGS—CRANDALL—FAY.



TESTING, digging up and throwing away seedling currants have been my experiences for years. It has been rather discouraging work, but the student of plant life knows how firmly fixed in their habits our common fruits seem to be. Indeed, it is well that they are so fixed, for reversion and deterioration under ordinary cultivation are thus happily prevented.

I find that the vital point in improving plants is to raise the seedlings under the best possible conditions. For if the young plants are started into existence under ordinary circumstances there will be no cause for any variation, and the plants will simply repeat the parent forms.

My observation is that there is less tendency to sport in currant seedlings than in anything I have ever grown; and there is little or no tendency to reversion. Nearly all the seedlings are as good as the parent forms, except in the case of Fay. The fruit of the seedlings of this variety is not so large as that of the parent plants; and there is a curious fault of Fay's currant that does not seem to repeat itself, generally, in the seedlings, namely, the tendency of the stronger growing shoots that come up from the bottom to become loosened by the wind or by handling. This same defect is also seen in the old Cherry currant, which I think is the parent of the Fay. I also find that nearly one-half of the seedlings of Fay bear white fruit.

Grape seedlings upon my grounds come as albinos in about the same proportion, and the strong shoots on some of the seedlings have a tendency to become loose and easily detached. I have not observed either of these peculiarities in wild plants.

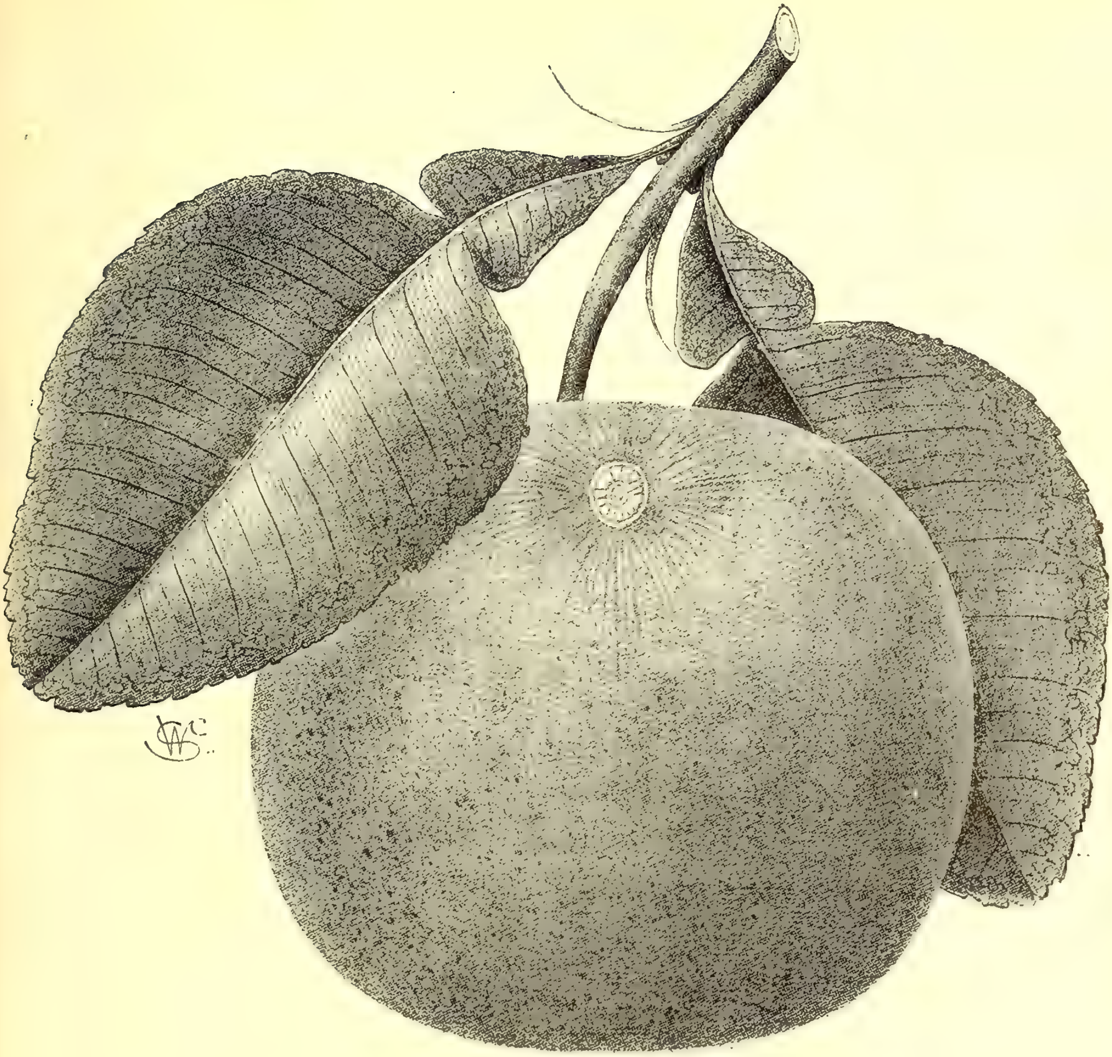
The seedlings of most of the currants are stronger and more vigorous than their parents. There seem to be two causes for this result. In the first place most of my seedlings have been artificially cropped, and some of them are real hybrids. Second, I think the old sorts have more or less run out.

The Crandall currant seems to be a sport of the old Missouri currant, and it is not so fixed in its habits as most of our older currants. I think it is of little value, except perhaps for hybridizing. I do not desire to convey the impression that there is no hope in new seedling currants, or in the labors of the hybridist. This is not in accordance with my observation. But the work must be better done, the subject more carefully studied, and the materials for experimentation more closely sought out. All my work heretofore has not been in vain, though most of it certainly has been. I have two white seedlings, saved out of the hundreds thrown away, that show improvement. One is like White Grape in every respect, except that the fruit is decidedly larger. The other is similar, but its distinctive feature lies in the foliage. For some unknown reason this does not seem to be relished by the worms. Perhaps this variety is a cross with the black, or the Missouri currant, although no other trace of that variety can be seen. I have both upon my grounds, and have several times attempted to hybridize them. But the pregnant fact, nevertheless, is that the foliage of this variety seems distasteful to the worms, and they let it severely alone. I intend to have this variety tested by some of our leading nurserymen, under other conditions, and if it continues to be so near worm-proof in other places, I shall feel that my long task of attempting to improve our currants has not been in vain.

Fay is somewhat deceiving. It has the largest berries, but these contain really less pulp and juice than some other currants. The seeds are more numerous, and as large again as those of other varieties, and it consequently makes less jelly than do the smaller currants. The unusual size of Fay is largely due to its unusual development of seeds. There are twice as many seeds in the Crandall currant as in ordinary varieties, but they are not so large as those of Fay. The skin of the latter is also rather thick, so it will be seen that there is little room for pulp, and pulp, not skin and seeds, is what is desired.

The Crandall currant ripens at the wrong time of the year, during the raspberry season. But its flavor is better and more fruity than that of the common black currant. The berry is about the size of Lee and the clusters are emaciated, like its supposed parent. It may yet prove useful in hybridizing.

New York. **D. S. Marvin.**



AURANTIUM POMELO.

THE POMELO, SHADDOCK OR GRAPE-FRUIT.

Citrus Aurantium, VAR. *decumana* and *pomelana*.

THE SHADDOCK has been distributed over a very wide range of country. Seeman says that it is "extremely common about the Fiji Isles, covering the banks of the rivers." De Candolle says "In China the species has a simple name, Yu, but its written character appears too complicated for a truly indigenous plant." It is said to be common in China and Cochin China, and also remarked that in the islands to the east of the Malay Archipelago, the clearest indications of its former existence in a wild state are found.

Shaddock was the name of a captain who first introduced the species into the West Indies. The names pomelo and grape-fruit are probably local names given it since it came to Europe. The name grape-fruit probably comes from the manner in which the fruit is born on the tree. It hangs in clusters, like the grape, twenty or more forming a bunch. The amount of fruit a tree will produce is surprising.

There are three distinct forms of shaddocks. The largest form is called pomelo, then comes the shaddock, and the smallest, the grape-fruit variety. Another variety is called pink shaddock, from the red color of the fruit. I am at a loss to know whether this was one of the distinct forms imported by Captain Shaddock, for De Candolle, in his "Origin of Cultivated

Plants," makes no mention of it. Its introduction, I think, took place long after the orange was brought here, for in no case have I found the grape-fruit wild; and both the sweet and bitter sweet oranges, as well as the lemon, are found in a wild state.

There have been several importations of shaddocks from India and other countries, but in no case have I found the specimens to be improvements over those first introduced. There have been, however, very decided improvements in our varieties during the last decade. The form in some instances has become somewhat changed; the size has become smaller, the skin is thinner, and there is less seed and "rag" in the fruit. The quality has been changed from the pungent acid of the old form to a delicious sweet flavor. All of these changes, so far as I have seen, have been produced by chance seedlings, some of which have been more or less preserved by budding. I am very much inclined to the belief that often they are accidentally crossed with the orange. One variety, I might mention, the Aurantium pomelo, as the name implies, partakes of both the sweet orange and shaddock flavors. It is said to have been produced by an orange seed. This tree has the form of the orange, while the fruit is produced in clusters, thus combining the distinctive features of both.

In quality, to many tastes, this variety is superior to the orange. The bitter principle of the shaddock is retained, but it is so blended with the sweet and acid of the orange that it forms a flavor which is particularly agreeable. It would be but speculation to attempt to account for these changes, yet I believe that our peculiar climate, which in other instances has brought about pomological changes that scientists of other sections have told us could not be, has caused this remarkable fruit, when crossed with the orange, to retain the health-giving principle of the parent grape-fruit, that is so highly spoken of by our best physicians, and at the same time to acquire the luscious, sweet flavor of the orange. In the orange markets there is a rapidly increasing demand for the common grape-fruit, and I believe that with the introduction of these improved varieties, the demand will so increase that the shaddock will become more popular than the orange itself.

JAMES MOTT.

Orlando, Fla.

AN ENGLISH NURSERY.

WHILE in England during the past summer I had the pleasure of visiting some of the most prominent horticultural establishments in and around London. I called upon the celebrated firm of James Veitch & Sons, of the Royal Exotic Nursery, Kings Road, Chelsea, where I had an opportunity of going through their extensive houses, and seeing nearly everything that was new or rare in exotics. Although I had long known that this firm stood at the head of European nurserymen in the introduction of these plants, I was scarcely prepared for such a display of good things; but as my object was more the study of hardy ornamental trees, than flowers, I will not attempt to describe any of the plants I saw in the houses. Not long after my first visit to Chelsea I received an invitation from Mr. H. Veitch, the head of the firm, to visit their nursery at Coombe Wood, Kingston Hill, Surrey, where their hardy ornamental trees, shrubs, conifers and American plants are grown. We were accompanied there by Mr. James H. Veitch, who is an enthusiastic admirer of fine trees; after a drive of about seven miles from Chelsea, we reached Kingston Hill, where the nursery is located. It is a commanding spot, in the neighborhood of fine villa residences. On entering the nursery my attention was directed by Mr. Veitch to a long avenue of superb trees, consisting of *Araucaria imbricata*, alternating with *Sequoia gigantea*. The araucarias are the finest of their kind to be found anywhere in the neighborhood of London and the sequoias are equally fine, although not quite so large as some that are growing in the grounds of Ellwanger & Barry, at Rochester, N. Y. This extensive nursery contains the largest collection of new and rare trees, shrubs, and conifers of any in England. The late Mr. J. G. Veitch was a most indefatigable collector, and introduced many fine things. After leaving this beautiful avenue we passed to the general collection of conifers, where I saw the beautiful *Abies Veitchii*, discovered by Mr. Veitch in Japan, and introduced by him into England in 1860. I recognized many old favorites introduced from the Pacific coast that were growing remarkably well here, *Abies amabilis* being one of them. It is a beautiful tree when young, as it is well furnished with branches from the ground upwards. It grows in California on the summit of the Sierras at an altitude of seven thousand feet, so it is quite hardy. *Abies Douglasii* was very fine, also *Abies Albertiana* and *Abies* *pungens*, *glauca* was growing finely here, being regular in outline and remarkable in its glaucesence. It is a most beautiful lawn tree and ought to be a great favorite in America. To me it was a very interesting sight to observe so many young and beautiful trees introduced from the Pacific coast range flourishing so well in this nursery. Passing from the fir trees to the cedars our attention was directed to some fine specimens of *Cedrus Atlantica*, *glauca*, a most beautiful lawn tree, as in fact nearly all the cedars are; and such varieties as were presented to me here in all their youth and beauty were afterwards seen in all their majesty in many of the large cities in England, for what tree is there that will equal in grandeur or that will harmonize with the Grecian style of architecture like the Cedar of Lebanon, and what a royal tree is the *Cedrus Deodara*, or Indian Cedar! It is a magnificent species, and when grown singly on a lawn is very striking. The young trees of this species as grown at Coombe Wood Nursery were remarkably handsome in their foliage. It is considered by many as the most beautiful of all ornamental trees.

Of the cupressus which I saw here, *Cupressus alba, spica nana*, a garden variety, was very pretty; also *C. albo-variegata*, *C. glauca*, and *C. fragrans*. *Larix Kæmpferi*, the golden larch, was very striking. Among the Japanese cypress were some very striking species, such as *Retinospora filifera*, *aurea*, *R. leptoclada*, *R. gracilis*, *aupea*, and *R. argentea*. Besides all these I have mentioned, they grow large quantities of all kinds of hardy trees and shrubs, many of which are remarkable for their foliage, form and color. Of these I will mention golden arborvitæ, golden yew, silver holly, Japanese maples, purple beech. The *Acer Negundo, fraxinifolia variegata* is a very striking object in a landscape, with its silvery, paper-like foliage. It immediately attracts attention and is considered one of the most effective trees when viewed in contrast with the deep green of other trees. It is in great demand for this purpose, and it is sometimes used in connection with *Prunus Pissardii* for grouping; in fact, there is a great demand in England for nearly all kinds of trees and shrubs having high-colored, variegated striking foliage. American plants, such as rhododendrons, kalmias, hardy azaleas, and andromedas, in all their varieties, are grown in immense quantities at Coombe Wood Nursery. In fact I found this place replete with good things, most carefully and systematically grown, and thus of good salable quality.

Rochester, N. Y. Wm. Webster.

NOTES FROM A GARDEN HERBARIUM—II.

OUR BLACKBERRIES AND RASPBERRIES.

OUR CULTIVATED brambles fall readily into two groups—the blackberries, characterized by the adherent receptacle or "core" which pulls off with the fruit, and the raspberries or thimble-berries, in which the receptacle parts from the fruit and remains on the bush. With the exception of the raspberries of the Fontenay and Fastolff type, all these fruits have come into cultivation within the last 70 years, and they are offspring of our common wild species. None of the varieties differ widely from the wild species, and yet, in a botanical sense, they are little understood. There has never been an attempt, so far as I am aware, to refer our cultivated sorts to their proper species and botanical varieties. The brambles are a puzzling group. In Europe, the blackberries run into almost endless natural varieties, and the knowledge of them is much confused. Our own blackberries are widely variable and they need to be systematically studied.

The common blackberry, *Rubus villosus*, runs into high and low forms. Of the high bush forms, four types are readily distinguished, at least by characters of fruit:

Rubus villosus, Aiton. Fruit firm and dry, narrow, varying from nearly globular on stunted plants to long-oblong on thrifty ones, dull in color, sweet, the drupelets small and closely packed.

Var. sativus, new variety. Fruit larger, loose and soft, broad, globular or globular-oblong, shining, sour until very ripe, the drupelets large and fleshy. This is the parent of nearly all the cultivated varieties of high blackberry, most of which are simply wild forms transferred to the garden. It is probable that characters of habit and of various organs are different in these two types, but I am unable yet to designate them. It will be an interesting experiment, which we are now making, to determine if cultivation will modify perceptibly the characters of the long and firm fruits of the forms which I have referred to the type of *Rubus villosus*.

Both these plants are characterized by broadly ovate leaflets, hairy glandular leaves, petioles and inflorescence, a more or less elongated and nearly or quite leafless inflorescence, and large long-petaled flowers. Fig. 1 shows a wild plant of *Rubus villosus*, with a short inflorescence.

Var. frondosus, Torrey. (Fig. 2, p. 723.) Plant lower and more bushy than the above, the leaves smaller and more thickly placed upon the bush, persisting longer in the fall; leaves smaller, smooth or nearly so when full grown, the leaflets ovate-oblong and coarsely toothed; inflorescence shorter, nearly smooth, scarcely or not at all glandular, the lower pedicels subtended by small entire leaves, giving the cluster a leafy or *frondose* appearance; flowers smaller. The Early Harvest belongs to this variety. Fig. 2 shows the essential characters of this variety, when contrasted with Fig. 1. The coarse dentation of the leaflets is an important point, which is commonly overlooked.

Var. albinus, new variety. (*White Blackberry.*) Lower than the type, the stems throughout greenish-yellow; leaflets much as in the var. *frondosus* in shape and dentation, but more or less hairy and glandular; inflorescence long but bearing simple bracts as in the last variety, hairy and glandular; fruit small, creamy white or amber-colored. I have known this plant from childhood. It grew sparingly in the woods in western Michigan, and it was occasionally transferred to gardens. In one garden, at least, it has grown for more than twenty years, and it has always retained its characteristics. I suppose that the white blackberries sometimes advertised by nurserymen belong here, but I have no specimens of them.

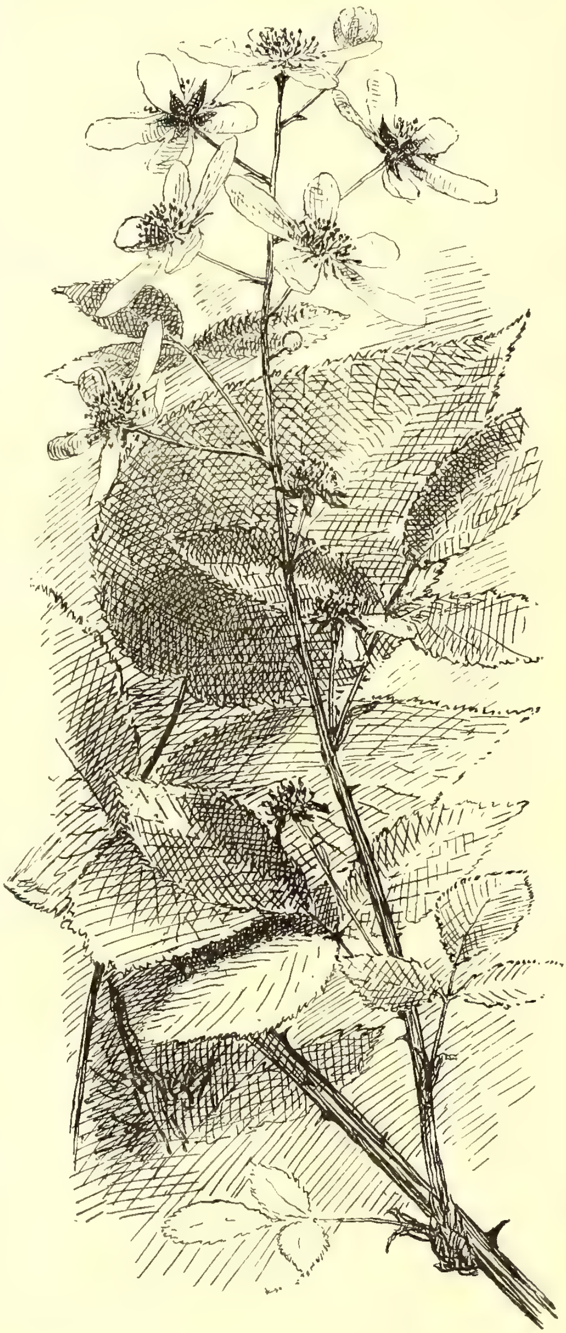


Fig. 1. Rubus villosus.

The raspberries are generally placed in two divisions, although these divisions are by no means so definitely marked as we have been led to suppose: those propagating by sprouts or suckers from the root, and those propagating by stolons or root-tips. The characters of the inflorescence or flower clusters are the most important distinguishing marks in our raspberries, although they have never been given much prominence in the botanies. The various species, I think, are as follows:

Rubus Idæus, Linn. (*European Raspberry.*) Plant usually stiff and erect, the stems bearing nearly straight slender prickles or weak bristles, and usually light-colored; inflorescence sub-corymbose—the pedicels short, and aggregated above, where they are erect or ascending; fruit large and broad, appearing more or less continuously throughout the summer, purple or yellowish. The raspberries belonging to this species are usually tender in the north, and they have not been grown to any extent since the introduction to cultivation of the native species. Here belong the Fontenay and its kin.

Rubus strigosus, Mich. (*Red Raspberry.*) Fig. 3, p. 723. More slender than *Rubus Idæus;* stems, at least in the wild plant, densely clothed with straight and weak bristles, usually brown or reddish-brown; inflorescence racemose, the peduncles scattered, all slender and drooping, either simple or two or three-flowered, not aggregated at the top, smooth or bristly; petals as long as the sepals; fruit light-red, usually smaller than in *R. Idæus.* The racemose character of the inflorescence of this species is well shown in the Cuthbert (Fig. 3), a variety which appears to closely represent in all particulars the true *Rubus strigosus.* Hansell appears to be *R. strigosus* also. The wild plant is densely clothed with weak bristles, but these mostly disappear in cultivation. They sometimes persist near the base of the cane, and traces of them can be seen in the inflorescence.

I am growing a white-fruited raspberry, sent me by

A. S. Fuller, which is *Rubus strigosus*. The stems are whitish. The leaves also possess a curious dentation, the teeth being rounded and tipped with a short cusp, but I am not sure that this is a constant character, or that the variety possesses any other distinguishing mark than albinism.

Rubus occidentalis, Linn. (*Blackcap*, *Thimbleberry* of some.) Fig. 4, p. 723. Stems long and at maturity recurved and rooting at the tips, conspicuously glaucous, armed with stiff, hooked prickles; inflorescence densely cymose, the peduncles all aggregated or rarely one or two somewhat remote, short and stiff, simple and erect, bearing stiff prickles and sometimes also straight bristles; petals shorter than the sepals; fruit depressed, firm and dense, black. Fig. 4 is an excellent illustration of the fruit cluster of *Rubus occidentalis*. Here belong the Gregg, Hilborn, Ada, and others.

There are still a number of garden varieties which do not fall under either of the above species, but which may be separated as

Rubus neglectus, Peck. (22nd Rep. Reg. N. Y. State Univ. 53, 1869). Figs. 5 and 6, pp. 721 and 723. Habit various, but the stems in typical forms long and rooting from the tip; stems glaucous, usually more or less armed with prickles, often bristly also; inflorescence racemose-cymose, the peduncles short and usually prickly, mostly stiff, the upper ones erect or ascending, simple or nearly so above but unequally branched below, some of them aggregated above; fruit varying from purple-black to bright purple or even yellowish. Among cultivated sorts, the Shaffer (Fig. 5) may be considered the type of the species. A glance will show the aggregated character of the fruit cluster at its apex and the gradual tailing out of the cluster at the base. The unequal branching of the lower peduncles is not well represented in this specimen, although it is apparent. This unequal branching is seen both in the lengths and ages of the branches. The lowest branches of the cluster are apt to be imperfect. These imperfect lower berries are well shown in Fig. 6, and also in the cut of the Gladstone, page 564, September issue. There are all gradations from the heavy-topped cluster of the Shaffer to that of the Caroline (Fig. 6), in which the upper fruits are only approximate; but even in the Caroline the inequality in age of branches of the peduncles is well marked, and other characters place

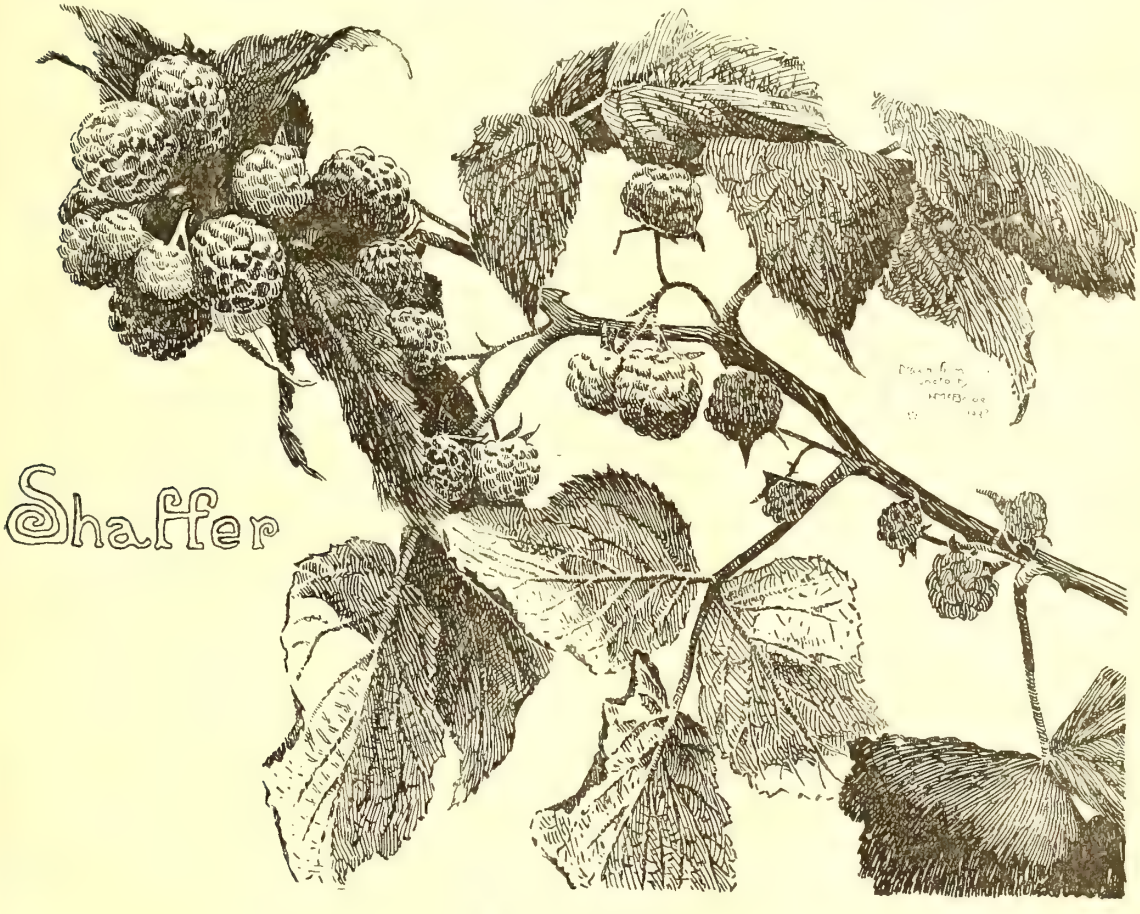


Fig. 5 Rubus neglectus.

this variety in *Rubus neglectus*. The garden varieties, in my herbarium, which are referable to this species are Shaffer, Caroline, Gladstone, Philadelphia, Reliance, and probably Crystal White. In a wild state, the species occurs here at Ithaca, and I have collected it at Lansing, Michigan. It is probably generally distributed throughout the northeastern states.

It has been said that *Rubus neglectus* is a hybrid between *R. strigosus* and *R. occidentalis*, and its intermediate and inconstant characters seem to warrant this disposition of it. But a hybrid origin is not proved, and I am glad that its features have been definitely described before its origin is determined, as it enables us to draw discriminating characters in one of the most confused groups of our fruits. There is no question but that the red and black raspberries will cross. We have made a number of hand pollinations this year, and if I am successful in growing the seeds I shall soon have a hundred or two plants to compare with *Rubus neglectus*.

A. S. Fuller, in his *Small Fruit Culturist*, appears to have been the first author to separate the *Rubus neglectus* class of garden berries. He calls them the "purple canes," and characterizes them as follows: "The principal difference between the varieties of the black cap and purple cane is in the fruit. The first, as is well known, has a rather dry, tough fruit, with a peculiar flavor. Its grains are numerous and very irregular in size. The fruit of purple cane, as a rule, is rather soft, juicy, often very brittle, the grains separating very readily; color varying from light red to dark brownish-purple, but never black; the flavor mild and agreeable, but entirely distinct from those of the true black raspberry." I do not know if all the varieties which Mr. Fuller refers to his purple canes are *Rubus neglectus*, but some of them surely are. I think that some of the sorts which have been referred to *Rubus Idæus* belong to it, and I am convinced that it is the most important type of raspberry known. From pure *Rubus strigosus* we appear to have obtained fewer varieties than is commonly supposed; Cuthbert appears to me to be the first decided advance in this species.

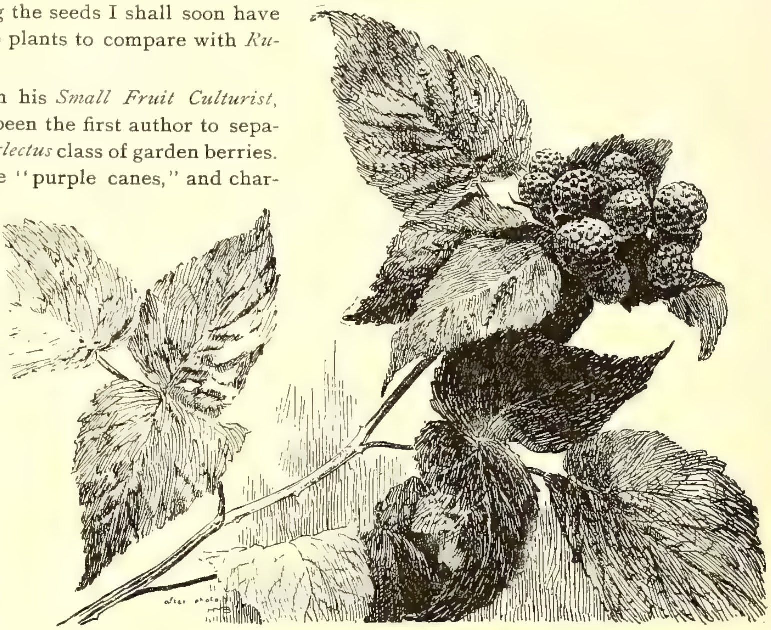


FIG. 4. GREGG.—RUBUS OCCIDENTALIS.

Both the blackberry and raspberry have come into prominence during the present generation, and even the introduction of the native species appears to run back no farther than 60 or 70 years. Neither the blackberry nor the raspberry was mentioned by Thatcher in 1825. Kenrick, in 1833, speaks of the blackberry as worthy of cultivation, and says that plants were then occasionally transplanted to gardens. Speaking of the wild "bush blackberry," he says: "This plant thrives in a rich moist sandy loam, and is often cultivated in gardens, where its fruit is much improved in size and its crops very abundant." "It is singular that a fruit so productive as the tall blackberry should be so little cultivated." He also speaks of the "trailing blackberry" and the "white-fruited bramble." The New Rochelle (or Lawton) and the Dorchester were among the first sorts introduced to cultivation. The Dorchester was first brought to notice in 1841, before the Massachusetts Horticultural Society.

"The first thing we find to notice in the exhibitions of 1841," runs the account in the history of the society, "is the high bush blackberry cultivated by Eliphalet Thayer in his garden, where it attracted much attention from its large and beautiful appearance." It was about 1850 that the variety was introduced into cultivation under a name. In 1857 "the Lawton blackberry was exhibited and carefully tested in comparison with the Dorchester (as the improved high bush was now called), the opinion being unanimously in favor of the latter." It may be said that the blackberry began to attract attention as a cultivated fruit between 1850 and 1860.

It is more difficult to determine the early history of the native raspberries, as they are not always distinguished from the European varieties in the early accounts. Kenrick, 1833, does not consider the native sorts worth a special rating. He dismisses them with this sentence: "There are two American varieties, quite distinct from the above, which may deserve to be enumerated; these are Black American raspberry and White American raspberry." Selected wild varieties began to be freely introduced about 1860.

Some of our older pomologists should give us their recollections. L. H. BAILEY.

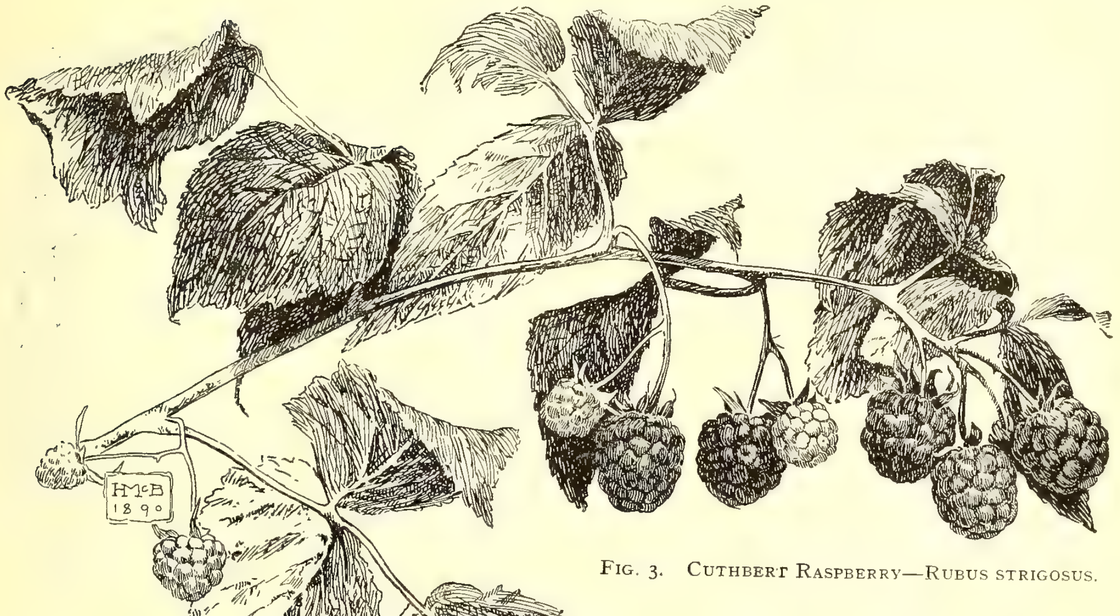


FIG. 3. CUTHBERT RASPBERRY—RUBUS STRIGOSUS.

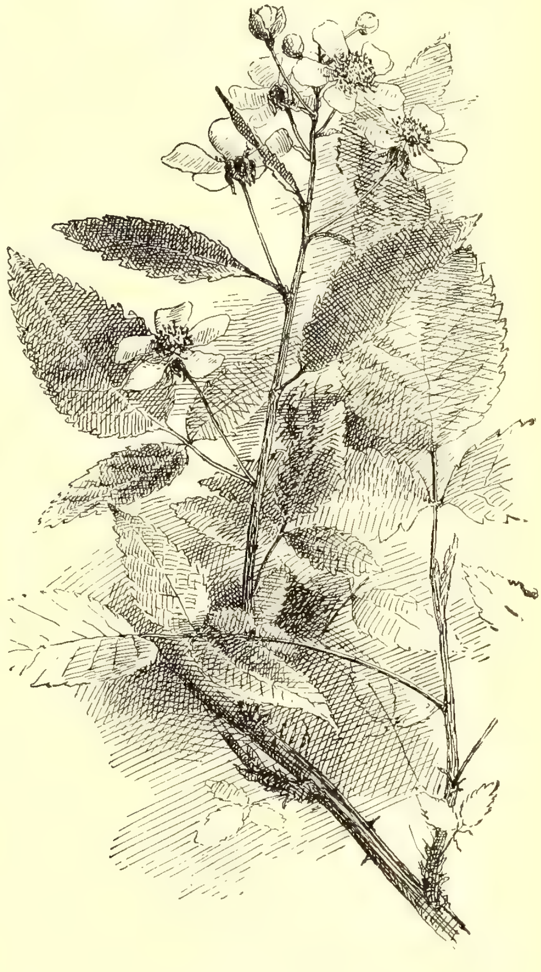


FIG. 2. EARLY HARVEST BLACKBERRY—RUBUS VILLOSUS, VAR. FRONDOSUS.

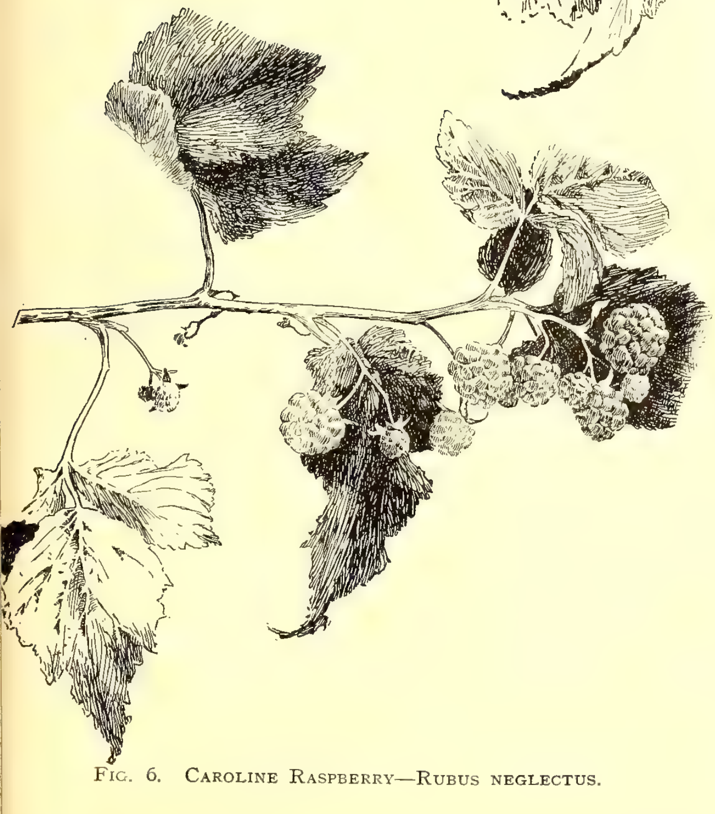
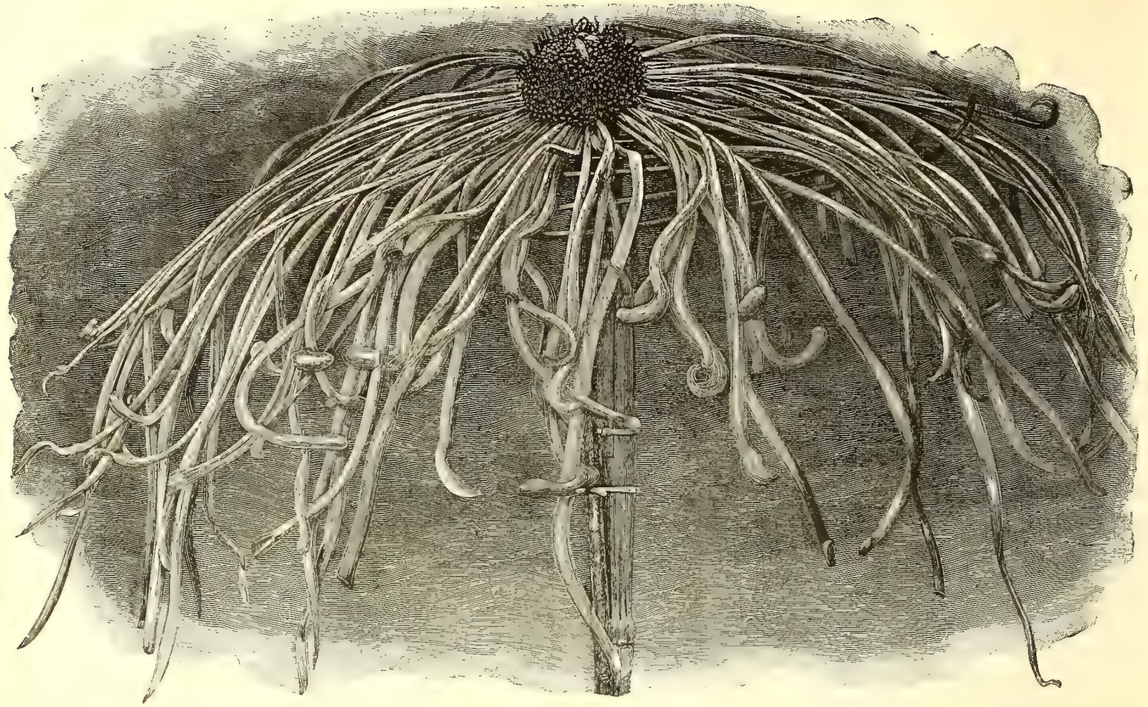


FIG. 6. CAROLINE RASPBERRY—RUBUS NEGLECTUS.



Kanakwmi: From a Photograph taken in the Gardens of the Emperor of Japan.

Three-fifths natural size; petals measured 16 inches from tip to tip.

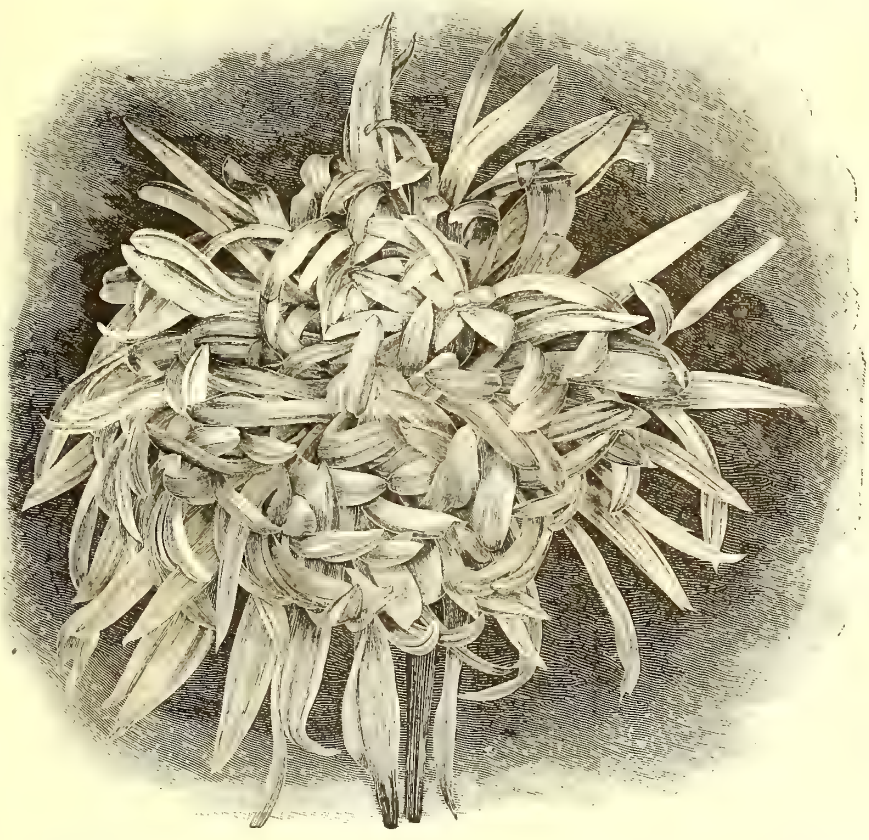
CHRYSANTHEMUMS AT THE JAPANESE COURT.

THERE are still many chrysanthemum growers in England who can carry their minds back to the time when the first Japanese varieties of the "Autumn Queen" were exhibited at the meeting of the Royal Horticultural Society, towards the close of the year 1861. Mr. Robert Fortune had made his second visit to the Far East in search of horticultural novelties, and in describing his discovery of the new flowers, he said: "I procured some extraordinary varieties, most peculiar in form and in coloring, and quite distinct from any of the kinds at present known in Europe; one had petals like long thick hairs of a red color, but tipped with yellow, looking like the fringe of a shawl or curtain; another had broad white petals striped with red like a carnation or camellia, while others were remarkable for their great size and brilliant coloring. If I can succeed in introducing these varieties into Europe they may create as great a change among chrysanthemums as my Chusan Daisy did when she became the parent of the present race of pompons."

It is now a matter of history that Mr. Fortune not only succeeded in the introduction of seven different varieties of these new flowers, but that English florists looked upon them with supreme indifference, if not actual contempt. Chrysanthemum growers here had set up a hard and fast definition of what a show chrysanthemum should be, and anything that deviated in the least from their standard was rejected as a worthless and imperfect thing. It is easy to understand that the eye, long accustomed to look upon the regular, symmetrical form of an incurved chrysanthemum, with stiffly dressed petals, arranged with patient care by the friendly help of a pair of tweezers, could not tolerate the weird, fantastic, flimsy, long-petalled Japanese blooms that suddenly made their appearance on the exhibition boards at that time.

But outside the select circle of the old-fashioned florists was a large body of small amateur cultivators who had then begun to take up chrysanthemum cultivation, and numerous chrysanthemum societies were just then on the point of formation. When the Japanese flowers gradually crept into cultivation, visitors at the shows, and the public generally, who cared nothing for the hard and fast lines laid down by the florists, were astounded at the marvellous variation of form and coloring in the new flowers, and that did much to encourage raisers and importers to obtain new varieties of the recent novelties.

The flora of Japan was but little known before Fortune's time, and his discoveries led many people to make inquiries on the subject. In a short space of time we learned that for ages past the chrysanthemum had been grown in that country, with a devotion almost beyond precedent in the west. Reports came to hand of a splendid fete annually held in the gardens adjoining the Emperor's palace, where chrysanthemums were said to be produced in such a way as would astonish the most able growers in Europe. It is also noteworthy that so little was the art understood in England, at the time of the introduction of Fortune's novelties, that when exhibited here they were pronounced to be far inferior in size to those commonly seen in their native land.



Utakata: From a Photograph taken in the Gardens of the Emperor of Japan.
Three-fifths natural size.

As an enthusiast in chrysanthemum matters, the writer of this paper has never ceased to take a great delight in reading everything that came to hand about his favorite flower in the Far East, and the desire to obtain fuller and better particulars on the subject led him, a few years ago, to place himself in correspondence with a gentleman holding an official position in the Imperial University of Tokio—Mr. W. K. Burton—from whom he has been so fortunate as to secure much valuable and interesting information of a literary and artistic nature.

It is of primary importance, however, for the present to confine the scope of this paper to the Emperor's annual chrysanthemum fete. How long it has been held is difficult to say, but we are informed that chrysanthemum shows were originated in Japan about 1,000 years ago, in the reign of the Mikado Ouda. Invitations are sent out only to the highest officials in the land, and such foreigners of distinction as the imperial household may choose to honor, and the invitation is consequently much valued and sought after. It is usually held on the ninth of November in each year, but the guest is informed, by way of precaution, that if the ninth is a wet day the fete will be held on the tenth, and should that day be also wet, it will not be held at all.

The tickets, of which the writer has one, are prettily designed. In size they are about eight inches by six inches; the border is composed of chrysanthemum flowers and foliage printed entirely in gold, on the top of which is a large heraldic kiku-mon or chrysanthemum crest, the national arms of Japan. The text of the invitation is printed in black ink within the golden border, and is of course in the Japanese language.

Mr. Burton last year was honored far beyond precedent, for he received the command of the Imperial Household Department to attend and photograph the show; the first time, it may be explained, that a camera has been allowed within Emperor's gardens. Fortunately for the readers of The American Garden he was graciously permitted to present the writer of this article with a set of the views he took on the occasion, and was furthermore honored with permission to allow some of them to be reproduced in this journal.

There is usually a banquet held in connection with the fete, but last year, owing to the indisposition of the Emperor, it was temporarily abandoned, although visitors were permitted to view the flowers in the ordinary way. Mr. Burton says that he had previously had the privilege of attending the fete, and that to persons who are unacquainted with the chrysanthemun culturally it is a grand sight to look upon the marvelous trained specimens and monster blooms, many of which are specially raised from seed year by year for the Imperial gardens.

The gardens are extensive and the views very beautiful. The chrysanthemums are displayed in tents and under awnings of purple silk, bearing upon it the imperial kiku in rich profusion. The object of course is to prevent the rain or sun damaging the flowers. There is always a large assembly of visitors who have an hour or two to roam about and see the gardens in general, and the chrysanthemums in particular. Bands play all the time, and the arrival of the Emperor is announced by the playing of the national anthem. He appears walking in military uniform, followed by a considerable retinue. He addresses a few words of welcome to each representative of the treaty powers, who are congregated in a little group to await him; then all follow in a sort of irregular procession round the gardens to a large tent where the banquet is held. The Emperor and his suite sit at a table at the end of the tent, whilst the guests stand at a long table that extends the whole length, or sit at little tables placed on the grass in front. When the Emperor and his party have finished they form a procession out of the gardens again to the sound of the national anthem, and then the visitors are allowed to enjoy themselves as they please until sunset.

In the photographs taken by Mr. Burton every type of Japanese chrysanthemum known in England is represented, besides some with the forms of which we are as yet unfamiliar. Thus we notice blooms deep and full, with long, broad, grooved incurved petals, resembling Comte de Germiny, Boule d'Or, Grandiflorum, and others belonging to that distinctive type. Then there are some with thread-like petals, standing out erect and stiff, and some having enormous long tubular ones, analogous to the variety called Kanakwmi, illustrated on page 724.

As to the methods of cultivation adopted, it would indeed be difficult to describe them all. Some plants are grown with numerous varieties, grafted on to a single stem and trained fan-shaped; others are to be seen grown in the form of huge flat pyramids. One plant of a group of three which was photographed carried 417 fully developed blooms at one time, another had 346, and the third being furnished with 243. But the Emperor's gardeners are not restricted to the system of growing a large number of flowers on a plant for decorative purposes; they also understand and are adepts in the culture of specimen blooms. One of the photographs represents a house with several hundred single stem plants, all bearing one large bloom, each of colossal dimensions, and in this photograph the variety of form and coloring appears beyond our imagination.

The names of most of the flowers are of course written in Japanese, but they are on curious long tickets tied just beneath the bloom. Some of the principal sorts are poetically translated, as Autumn Mist, Mountain Cloud, Ten Thousand Times Sprinkled with Gold; others are merely Japanese names romanized, as Sug-aw-ara, Kagaribi, Aunobiki, Ogonno Tsuyu, Hanakai, Sanono Watari, Utakata, Chikiwgi and Kanakwmi.

The last named variety is one of the most singular in this extremely interesting collection, although in England we should hardly consider it up to our standard of an exhibition flower. The petals are of great length, but the huge yellow seedy center would not be regarded with favor here. When fully extended the petals measured exactly sixteen inches from tip to tip, and were of a deep bronze yellow hue. The illustration here given (p. 724) will convey some idea of this curious form as seen in the Emperor's collection.

Of Utakata, another variety also figured, two views were supplied by Mr. Burton. In addition to the single bloom, one represents the entire plant, literally covered with large blooms of the purest white. It appears to be a valuable flower, being of good size and substance, quite solid in build, and was raised from seed.

In one of the photographs, where only single stem plants are shown, the foliage is thick and leathery, showing that cultivation of the highest kind has been adopted. The plants are all staked with bamboo supports, and in those cases where the flowers are composed of long thin petals a circular wire support is placed close up under the flower to keep it in proper position. Many of the examples portrayed are quite double, but a large proportion are what we look upon as single-flowering Japanese, being easily distinguishable by their large yellow centers or eyes. There are but few flowers bearing resemblance to the Mrs. Alpheus Hardy or Louis Boehmer type.

Although the Japanese Horticultural Society has recently depicted in its transactions a green flowered variety, we have not been able to ascertain definitely that the traditional blue chrysanthemum is included in the Emperor's collection.

In England until quite recently there have been few opportunities of growers being placed in possession of chrysanthemums imported direct from Japan. In America, however, it is otherwise, and from what we can learn here it would appear that the importations into the United States are more numerous and frequent. We have during the past few seasons received some important additions, and those known to have come from Japan are found to be very distinct from the varieties we have been in the habit of obtaining from the French raisers. Now that our means of communication with American importers of Japanese plants are becoming more easy than before, we may confidently hope to have many surprises in store in this interesting flower.

London. C. Harman Payne.

IN THE FLOWER GARDEN.

SPORTS—THINGS NEW AND OLD.

I FRANKLY confess to a liking for new things in the floral kingdom. If it was true in Solomon's time that there was nothing new under the sun, it can hardly be true to-day. We read of this, that and the other novelty in flowers, "It originated with Mr. So-and-So." Sometimes the novelty is the result of a sport from some other plant, and is not like the parent, in some respects at least. It was considered a remarkable thing when a double bouvardia originated. It was named Alfred Neuner, from its grower. Not long after there was a sport from this which was pink in color. Now we have three novelties in doubles: Hogarthi, a light scarlet carmine; flavescens, sent out by its French originator as a yellow—but it can only be called a lemon yellow when in bud and a creamy white in bloom; and Victor Lemoine, bright scarlet.

The beautiful Sunset rose is a sport from Perle des Jardines, and differs from it in color. The Bride is a sport from the lovely pink Catherine Mermet, but unlike that, is a pure ivory white. Gloire de Dijon has a combination of shades of amber, carmine and cream. Reine Marie Henriette, a seedling of Gloire, has bright red flowers, pure cherry red; while Waltham Climber, another seedling, is crimson. Melanie Soupert, also a seedling, is a pure white. We can not tell why these three seedlings from one rose should be so dissimilar.

Niphetos has long stood in the front rank as a white tea, especially for the beauty of its long pointed buds, although it is not a vigorous grower. Now from this rose we have a novelty in the form of a sport, J. T. Blair, named for the popular superintendent of the Pittsburgh, Shenango and Lake Erie railroad, in whose greenhouse it originated. Unlike Niphetos, it is a strong plant. The outside petals are pale yellow, and this color deepens towards the center, which is a rich golden yellow, suffused with rose. Thomas Meehan, former editor of the *Gardener's Monthly*, said of it: "The strangest combination of color ever seen in the rose." The fragrance is said to be different from that of any other rose.

Baroness Rothschild has long been considered a perfect rose in every respect. The color is a lovely delicate shade of pink. Now we have a sport from it, rightly named White Baroness Rothschild, which possesses all of the fine qualities of its renowned parent, except its color. Both are hardy. Pride of Reigate is a sport from the well-known hybrid perpetual, Countess of Oxford, but unlike that, this has flowers spotted and striped with white.

Another novelty is Vick's Caprice, a sport from Archduchess d' Autriche, a hybrid perpetual of a soft satiny pink color, while this has the soft pink ground distinctly striped and dashed with carmine and white. Thus we see that new varieties of roses are originated from sports and seedlings. Many are also obtained from cross-fertilization. It must be very interesting to those who experiment in this way.

I have had blooming in my garden for a month, beginning early in May, a novelty in poppies, said to be a sport from an old-time yellow flowering variety. Seeds were sent me for trial last spring. I sowed them but did not observe any seedlings till this spring, when I saw several plants that were quite new to me. They had round hairy buds. I was delightfully surprised when one unfolded into a large single, orange yellow poppy. The florist who sent the seed said it was thought to be hardy. A hardy yellow poppy, and blooming in May! Truly it is a novelty worth having. It keeps on developing new buds, and I hope it is a perpetual bloomer. The name of this novelty is "Nudicaule Aurantiacum." This spring I found it was catalogued by another florist last year, who sells plants only, at 50 cents each. He stated that this new and most showy of the Iceland poppies was awarded a first-class certificate by the Royal Horticultural Society, July 15, 1886. He has it named "Nudicaulei Miniatum Improved!" Some of the flowers, apparently from the same roots, are clear yellow, while most of them have the novel shade, orange-yellow, or orange-scarlet as the florist calls it. In the

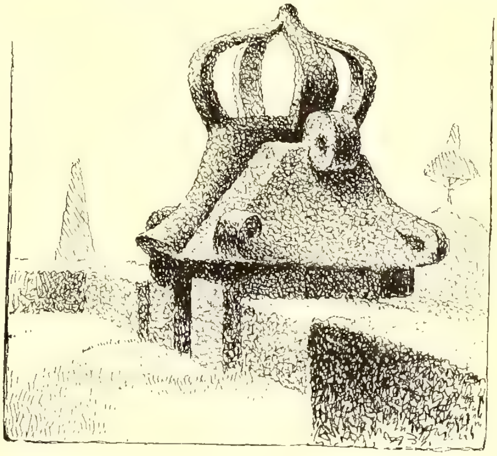


FIG. 1. AN OLD TOPIARY PIECE. (See page 728.)

same bed I was glad to find numerous seedlings of the large oriental poppy which bears immense single blossoms of a crimson-scarlet color with a dark purple, nearly black blotch in the center. Can it be that the seeds sown in June did not come up till this spring? I did not see any signs from them last year, and concluded none germinated.

Among the annuals, Snowdrift poppy has become popular wherever known. It was introdued two years ago. It has round balls of purest white. The new Japanese pompons have double flowers in colors of scarlet, crimson, pink, blush, lilac, white, some mottled and fimbriated. This year we have four "angel" poppies introduced, though this name seems to us a misnomer; Angel of Morn, pure white; Angel of Noonday, cherry red; Angel of Evening, bright rose; Angel of Midnight, "black, a novel and beautiful color." Novel indeed! More rare, if possible, than the orange-scarlet! We opine that the names are the invention of the florist in whose catalogue alone we find them specified. Whether they are new varieties, or old varieties re-christened, remains to be seen. The devices of florists are many, and not always exactly straight!

Mrs. M. D. Wellcome.

THE PROPER USE OF EVERGREENS.

ARCHÆOLOGY OF HORTICULTURE—A MODERN RENAISSANCE.

IN CONSIDERING the value of evergreens for general planting, it is the wise generation that profits by the experience of the past. I would call attention to certain matters which in past years attained more or less prominence, and even now we see attempts at imitating these features that are so weak as to be nothing less than ridiculous in the majority of cases. I refer to the practice of shearing and forcing conifers into various artificial shapes, known as topiary "art;" art it is, and that alone, and should have no more toleration than any "art" which has no counterpart in nature. In speaking of this matter, I do so with reference to existing modern conditions only, as I have no desire to condemn the practice under every and all circumstances.

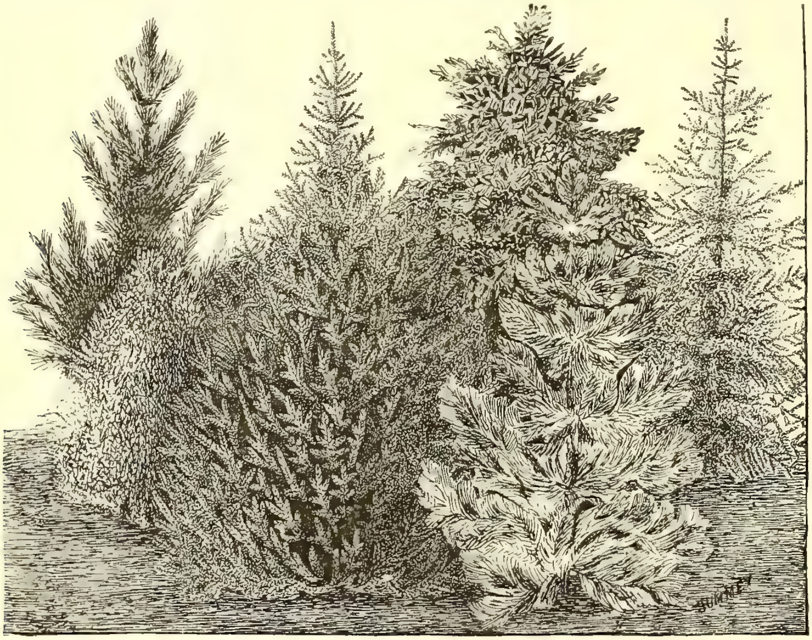


Fig. 2. Free Grouping of Conifers.

With the extensive employment of this art in England, under conditions of unlimited time, cheap labor and unstinted means, and under the artificial influence then prevailing, gardens of great extent were created that possess a rare interest to the admirer of human ingenuity and as examples of man's control of natural forces. Ability to surpass others in producing extravagant and grotesque forms was the highest recommendation of a gardener, not only with trees, but throughout the entire garden, where formality and affectation gained the highest appreciation. Some examples are still to be met with which are splendid monuments of patience and skill. Fig. 1 (page 727) will give some idea of the length to which this art was carried, being a portion of an illustration in Veitch's Manual of Coniferæ. Concerning the few remaining instances of the perfection of this work, Shirley Hibberd, I believe, in the following extract voices the sentiment of nearly all true garden lovers:

"I have a most respectful regard for the examples that remain to us, as representing the archæology of horticulture. It may be no difficult matter for the disciples of the little school of garden dadoists, who in most of their utterances combine variety with ignorance, to sneer at this sort of thing. But they never say anything really smart or witty that will affect the opinion in favor of keeping up the few good examples that are found in certain grand old gardens.

"When this style of decoration was in universal favor the world was smaller than now for the man of taste, and the 'curiously knotted garden' gave much delight, and aided greatly in softening certain features of human character that were a trifle too hard for healthy progress. For the observant student of plant form and artificial scenery (or natural scenery modified by art) this kind of work is full of interest. It is a thing the world will not willingly let die, albeit there may be much said against its continuance in an age which abounds alike in beautiful garden trees and progressive garden papers."

The prime object of landscape gardening as now understood is to enhance the beauty of nature; and in this impatient age this result must be apparent in the shortest possible time, and must also be enduring in its character. We have neither time nor money to expend upon anything that requires as much of both as a proper practice of topiary art, even were the element of beauty to be thus gained. Herein lies the contrast between old and modern methods; in Fig. 1 no trace of real beauty can be discovered, however long the study. Turn to Fig. 2 and what a sense of relief is felt! It is only a careless grouping of evergreens, but the group will increase in comeliness year after year.

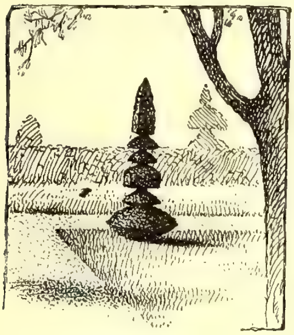


FIG. 3. A STIFF CORNER PIECE.

But it may be remarked, it is unnecessary to go to such an extreme; may not a specimen of this art, dotted among other features, tend to render the whole more interesting and attractive? This is a matter of taste which must be decided individually, to a large degree, but I wish to direct attention to Figs. 3 and 4, as affording an illustration.

The first shows one of two corners exactly alike, which, set off by a broad walk, occupies the foreground of a garden, and which was doubtless considered an attractive bit of garden work. To my mind, however, the scene would be far more beautiful were the two corners occupied by naturally grown trees, as shown by the hemlock spruce in Fig. 4.

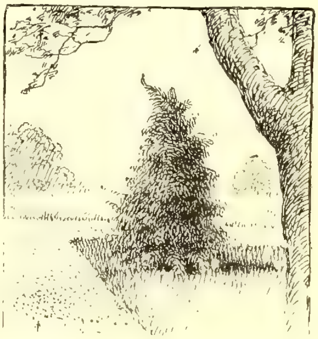


FIG. 4. A FREE CORNER PIECE.

In many of our cities it is not uncommon to see, on small lawns, specimens of topiary work. They usually attract attention from their rarity and oddity, but never by their beauty, which, indeed, they never possess. It is gratifying to note that these instances are not multiplying. True gardening art never resorts to such devices for winning notice, and soon, owing to the constant efforts being made to instill right principles, such weak attempts to imitate old-country style will no longer be seen. If one has an over-powering love for topiary work and can afford it, let him enter into and carry out every detail on a worthy scale, keeping the old and new modes entirely distinct.

Another evil in connection with the employment of evergreens may be seen in the older portions of our country, where they and other trees have been so thickly planted about the house that they now shut off air and light; even in winter such a place has a gloomy aspect instead of being cheeringly pleasing in the contrasts which, at this season, evergreens should present. Besides this, it may be mentioned that these trees are often planted too near walks and drives, and also in such positions that, as they grow, they shut out desirable views. Monotony is induced also by using too freely of only certain kinds, like pines and spruces.

These abuses, however, are fast being lessened by the general increase of popular knowledge on this subject. It has been made possible for the humblest home-owner to wisely select and properly care for such subjects as may best suit his special location, by placing at his disposal plans from which he may draw suggestions.

La Salle Co., N. Y. E. E. SUMMEY.

FLOWERS IN THE HOME GARDEN.

IT WOULD be extremely difficult to find another form of recreation so productive of pleasure as gardening in any of its varied forms. See the pleasant, sunny appearance that plants and flowers impart to a home; see the warm flushes of health that pervade the cheeks of those who cultivate them; and see the happiness and contentment that such people monopolize! Mark the popularity of our public parks and gardens in spring, summer and fall. The inhabitants of our large cities, who are not in a position to afford the luxury of a home garden, are pleased to go to such places, because, in doing so, they are benefitted mentally as well as physically. Here, in the contemplation of nature's charms, the troubles and anxieties of daily life are, for a time at least, forgotten ; in the respite fresh strength and courage are gathered for a renewal of the combat ; the senses and the mind are educated ; characters are ennobled, and life itself throws off some of those artificialities which serve to make it irksome, and partakes in some measure of the more agreeable tenor of the immediate surroundings. Who will have the hardihood to deny that the most corrupt mind is beneficially influenced by merely looking upon the sublime and beautiful productions of nature ?

Take a man whose life has been spent in one of our great cities, and place him for the first time in the open country—in a gigantic natural forest or on a large mountain—and wonder at the magnificence of his surroundings will speedily overcome him. And when we come to observe the little things of nature, they are found to be as prolific of astonishment as the majestic. If this be true of mere observation, may it not with safety be assumed that the action of natural influences is intensified by the closer contact with natural objects which we experience in caring for flowers in the home garden ? The assumption is entirely reasonable. We are better men and women as far as we have something that will strike from our hearts the selfish and bitter thoughts that are too often the result of commercial contact with others ; and, while we learn from that something, and elevate the character in pursuing it, we do, indeed, possess an eldorado. Then fill your vacant yards and gardens with flowers ; in studying their peculiarities and supplying their requirements you will find ample compensation—the world will be better and more beautiful.

A very important question now presents itself : Should our gardens be as artificial as we can make them, or should they be arranged in a manner as nearly natural as possible, consistent with order and artificial surroundings ? In answer, I unhesitatingly say that the flower garden should be natural. There are many arguments in favor of this position, but at present I can take only a passing glance at the more prominent.

Formal and fantastic designs in the flower garden seem to be waning, and it can hardly be regretted that such is the case. The fashion—or craze, as some would call it—which has prevailed so universally for a lengthened period, has swept into obscurity many lovely and deserving plants. They would not submit to the hard-and-fast laws of fashion ; they would not be confined to the narrow and unnatural limits assigned them ; they would persist in growing in their own peculiar way—the most interesting and most beautiful of all—and in consequence they were left in some hidden corner to exhaust their vitality in a lingering struggle against the remorseless and triumphant forces of neglect, or led forth from the garden to die an ignominious death on the rubbish heap. Unhappy fate ! Fortunately, however, every one did not fall victim to the fever. Though some had a slight attack, they were yet able to care for the neglected plants, as old friends should be cared for ; and accordingly, many things still found comfortable quarters in a few gardens. But, even with that grain of comfort, it is painful to think of the scarcity of many fine old species—the beautiful plants that adorned the rustic gardens of our forefathers. By applied energy, however, in the matter of propagation, we will speedily get over the question of scarcity in the majority of cases ; and then our old friends will return to our gardens to gladden our hearts and inspire poets with pleasing thoughts as they did of old. What poet has sung of carpet beds and ribbon borders ?

Though the carpet-bedding system has for a time deprived us of many old favorites, yet we must admit that it has been productive of some good. Our knowledge of the arrangement of colors was decidedly inferior previous to the general adoption of that system. By bringing the colors in close contact with one another, as its requirements demand, we could the more readily detect errors of taste, and our efforts to rectify them were lightened in proportion. In this respect we have gained, and that considerably. That the gain fully balances the loss is a matter that can be determined satisfactorily only by reference to personal knowledge and experience. A proper disposal of the colors, however, is one of the most important matters with which we have to deal in the effective arrangement of either flowering or foliage plants, and, therefore, anything that may have increased our knowledge of this subject should not be passed over too lightly. But after mature consideration of this, and of all other arguments in favor of carpet bedding, I feel bound to say that it has been prejudicial rather than beneficial to the best interests of the flower garden. In every feature it outraged nature. It is true that all gardens must be more or less artificial ; but art should help rather than oppose nature. The chief argument against the system, however, deals with the poor return afforded even after considerable outlay. To maintain it in its perfection entails a large and continual expenditure. Many grow weary of this unceasing strain upon their finances, and, in a few years, the garden becomes an object of neglect.

I am not disposed to quarrel with those who regard this system with favor. Opinions will continue to vary on this as on other matters in spite of anything that may be said, and I bow to the supreme right of each individual to say what shall be grown, and how it shall be planted. But there are certain individuals in all communities who have, to a large extent, the guidance of taste in such matters, and they are somewhat to blame for favoring the adoption of a costly, not to say unnatural, style, when they know it will ultimately be disastrous to that inherent love of nature and the beautiful. And I am further inclined to find fault with those who, having found incongruous designs or unbroken lines of dazzling colors unsuited to their taste, or finding the maintenance of such a system too costly, become discouraged and let the garden fall into disorder and ruin. They forget about the hundreds of plants that are capable of lending exquisite beauty to the surroundings of the humblest cottage or the most kingly palace at comparatively trifling cost; they forget about the innumerable species of hardy plants—fitted by nature for every conceivable situation—that require but a small share of care and attention in order to embellish our surroundings during two-thirds of the year, and in one disappointment they come to dislike the garden and the flowers with all their pleasing associations. Ah! ye disappointed ones, be not so perverse; do not shatter the happiness of the home circle by breaking the ties of love and friendship that the flowers wove in the summer's sun; do not let youthful minds, in darkened days of wintry blasts, fail to realize that the sun will shine and flowers bloom again in spring; but in your perplexity turn to the proper source, and suitable advice will be gladly given!

A home garden should be a place where room can be found for the favorite flowers of each member of the family. As this cannot be easily done while carpet bedding or ribbon borders prevail, it will be found advantageous to adopt the more natural and less expensive herbaceous garden. It is the real old-fashioned style of flower-gardening, and there is nothing spasmodic or extravagant about it. Every plant in such a garden has its own distinct individuality, and all have a story to tell. That great verbascum came from a friend in California; Mr. Smith, over the way, gave me that clump of solidago; those beautiful portulacas were raised from seeds that were sent by Aunt Kate last spring; I bought that splendid anemone in the market one day for five cents, etc., etc. It is our every-day garden where one always finds something interesting. There is no sameness about it, and it would be utterly impossible to see the whole garden by looking at one corner or even at the half of it. In the shade of the trees you will find a lot of rare ferns and other plants that do not like the sun. The alpine plants are quite at home in yonder mass of rocks and *débris*. If you wish to see all the different kinds of interesting and beautiful plants in the garden, you must traverse every yard of it—something you have not seen before will appear in every corner.

Mass. GERALD HASTINGS.

FLOWERS ON THE FARM.

HOW may we cultivate a small flower garden, have it showy and attractive, and yet not have it interfere with our regular home and farm duties? The barrenness of American farm-house yards is proverbial, and yet it is not through a lack of appreciation for beautiful things. There is always so much hurry with the farm work, and the household duties are generally so exacting, that if a small vegetable garden is cultivated, no time seems to be left for devotion to flowers. The simple beauty of a blossom may not feed your body, but the symmetry of its petals, and the fragrance of its breath, may revive memories long since forgotten, and bring you face to face with childhood days, and the sweetness of a mother's voice. Yes, flowers are always beautiful, always useful, and always profitable to our mental and moral growth; let us labor to increase rather than to restrict their culture.

If the plan of culture is rightly laid out it will be a most pleasant recreation for resting moments. In the first place, do not try to do too much; do not attempt to cultivate too large a space in flowers. If your yard has previously been overrun with grass, and is liable to be very weedy, do not isolate the beds one from another, but confine them within one common space. You will find this an indispensable precaution when it comes to keeping foul growth subdued.

The first essential is a rich friable seed-bed, without which we can expect but poor returns either in the vegetable or flower line. Spade up your designated plat, and fertilize it according to the natural richness of the soil, being sure that the mold is sufficiently enriched, as on this depends in a large measure the proficiency and beauty of the flowers. I have had no experience with chemical fertilizers for the flower garden, but do not see why their judicious use would not bring excellent results. Bear in mind that when you have prepared a rich mellow bed, free from grass and weed seeds, three-fourths of your labor on the flowers has been accomplished.

If your time is limited, and you are trying the culture of annuals as a mere experiment, it will be the part of wisdom to select for propagation only those varieties that are profuse bloomers, and of hardy constitution. Suppose that you have a plat sixteen feet square, with a southern or eastern exposure. Lay off a marginal walk completely around it, and allow space for two inside walks, to intercept each other at right angles in the center. The walks should not be over sixteen inches in width. This arrangement will leave you four beds, each some seven feet square, or less. Assign the two beds on either the north or west sides of the tract to flowers of the highest growth, and devote the remaining space in front to the smaller forms.

On the side of your little garden farthest from the sun a hedge of sweet peas would form a unique and beautiful border. Dispense with the brush in this case, and for a support for the vines use a row of stout stakes interlaced with cord or wire. The pea vine hedge, with its clusters of spicily perfumed bloom, will form a rich and striking back-ground for the garden. Directly in front of the peas, place on one side of the center path a zone of zinnias, and on the other a belt of mixed poppies. Divide the remaining space into zones at least two feet in width, which, being cut in twain by the center path, and planting different species on either side, would give room for at least ten more varieties. Next to the zinnias and poppies match asters with verbenas, then pair a zone of scabiosa (mourning bride), with a belt of mixed petunias. The next zone either plant to *Phlox Drummondi* entire, or divide the space with African marigolds. Next, place dianthus, or chinese pinks opposite to antirrhinum, or snapdragons. This will leave one border zone, which can be made most attractive and lovely by being entirely devoted to a choice selection of pansies. The marginal ends of the zones can be trimmed with a border of portulacas, which, when the flowers are in bloom, will form a brilliant side-setting for the liliputian garden.

In the selection of the varieties I have named I do not advise every one to observe the list to the strict letter; vary that according to your choice, but be sure to arrange their location so that there will be a gradual descent from a high back-ground to a low margin. There are many more ways of arranging a flower plat in a neat and tasty style other than we have described, but we think that for the amateur florist who has but little time and space to devote to the art, our simple method will yield most satisfactory results.

For the northern states not all the varieties named should be sown in the open ground. The zinnias, verbenas, and pansies, especially, should be started under glass, and transplanted to the plat. One of the most gorgeous and queenly autumn flowers is the dahlia, and no country yard should be without a hedge of them. They can be grown very easily from the seed, and bloom profusely the first season. Raise the young plants under glass, and transplant them two or three feet apart. Put well-rotted manure to the roots, for the dahlia is a strong feeder. Hoe the plants at intervals as thoroughly as you would corn, and the autumn harvest of bloom will be your rich reward.

Farmers, and farmer's wives, encourage the growth of flowers on your premises, and their fragrance and beauty will make your tasks lighter, and your lives longer and happier. GEO. E. NEWELL.

Leonardsville, N. Y.

A WOMAN'S GARDEN.

SOME LESSONS OF THE YEAR.

THE CHINESE LILY.—The Chinese lily is considered a most wonderful and choice flower. It is certainly very popular and extremely fashionable, and is supposed to be a "Sacred Lily" of the Chinese. Although it may be really the Sacred Lily of the Chinese, it is said to be the same thing as our own old Roman narcissus, and if this were known it would scarcely occupy the place of a new and rare thing (to say nothing of its being foreign), nor would it command the prices which it now sells for. Notwithstanding all this, it is very sweet and beautiful, and should command the interest of all flower lovers. Each bulb of blooming size, if rightly treated, will usually give six flower stalks, each stalk bearing several flowers.

To grow this lily use a large flat deep dish, or bowl. First put in pieces of charcoal, then the bulb in the center, and then fill with pebbles, keeping the dish filled with water. Set all away in a dark warm place, like a cupboard, until the roots grow. When the roots are formed, bring the plant into the light and warmth. The leaves will grow better if a funnel made of stiff paper is fitted over the dish. The funnel should have an opening at the top about an inch in diameter. When the leaves appear at the opening, take away the funnel and place the dish in a sunny window. You will be greatly pleased with the number of buds that soon appear, and much interest will be manifested in the flower.

Chinese lilies may also be cultivated in pots with great satisfaction. Take a four inch pot, fill it with soil of a rather sandy character, and cover the surface of the soil with a layer of moss, which should always be kept damp. The bulbs may be planted any time from November to May. They must, in order to succeed well, be properly watered, shaded, and cared for. They require plenty of sunlight when flowering. Although the fashionable manner of growing these bulbs is to put them in water, as first described, I have always had better success when growing them in pots of earth, the largest bulbs having sent up as many as twelve flower stalks completely filled with flowers.

Notwithstanding the fact that sometimes enormous prices are asked for this variety of polyanthus because it is foreign, new and choice, it is quite as abundant as many other bulbs which sell for much less. It is certainly very beautiful, and one must always pay a little more for style.

THE STAG'S HORN FERN, which is so odd, will grow in the house during the winter, if it is fastened to a piece of wood and set in a hanging pot, or basket, so that it may grow over the sides like a vine. It must be sprinkled quite often. It will grow well in almost any location, from a north window to a south one.

THE BACK YARD.—Always see that the back yard is kept neat and tidy the year around. Never allow rubbish of any kind to lie around. Nothing is more disgusting to see old sticks, dirty rags, or refuse of any kind thrown on the snow in winter, or in the mud during the wet season. If I could have either a nice tidy back yard or handsome grounds in front, I should have the back yard, and I should make it neat and clean, and even pretty, with velvety green lawn, and roses, shrubs and a bed of flowers; also nice little beds of radishes, lettuce, cucumbers, etc., if possible. Fine manure is much more valuable for crops and plants than coarse manure, as it mixes better with the soil, and is more easily appropriated by the plants.

THE HARDY GARDEN PINKS, in all their exquisite coloring and sweet fragrance, rank high amongst our list of hardy garden plants. There is *Alba fimbriata*, almost like a lovely pure white carnation. Then Snow, which is certainly the equal of a white carnation in size and form and color. But it is of another flower I would speak, the double *Lychnis Viscaria*. It is very like the pinks, yet botanically it is quite distinct. It is a very choice hardy plant for the garden, and every plant lover should possess at least one root of it. It grows well in nearly all locations, needing no particular kind of soil. It is very hardy, grows freely and blooms profusely. The flower stems grow to a height of eighteen inches, and support flowers of a bright, rich, magenta color. It may be easily increased by dividing the roots, and is very effective when planted in patches, in beds, borders or rockeries. It flowers in June, and is a pleasing plant.

EXOCHORDA GRANDIFLORA is a beautiful hardy shrub, a native of Northern China and Japan. It is related somewhat to the spiræas, and like them is perfectly hardy. It is of pretty, compact habit. The flowers are produced in racemes, and have pure white petals, showing a dot of green in the center. Each raceme bears from eight to ten flowers, the opened flowers being about an inch and a half in diameter. The buds are so cunning and so round that they look like pearl beads. The foliage is of a bright soft green, which adds to the beauty of the plant. This shrub is not very particular as to soil, as it will thrive and grow almost anywhere.

VARIOUS PLANTS.—There are many plants that are so hardy that they will flourish with but trifling care and attention, and without many of the advantages demaded by others which are more delicate in habit. But all should have proper care as to their needs, and should be given locations most suited to them, where they will do better and prove much more satisfactory. Many plants are like salamanders, and will stand any amount of heat and sunlight, and these do best if placed in a south window; others will thrive in an east or west window, but will grow very little if placed where they get the direct sunshine during the middle of the day. Few plants will bloom well in a north window, yet those which are grown for the beauty of their foliage, instead of flowers, generally do well in such a location; ferns, violets, begonias, etc., are among those which will succeed there. Geraniums and oxalis do best in a south window, while feverfew, begonias, callas, mignonette and fuchsias do well in east or west exposures.

There is one thing in the repotting of plants which is of the utmost importance, and which, when neglected by amateurs, will often cause failure. This is the proper firming down of the soil around the plant. Press it down as hard as possible with the fingers.

Drainage is also quite as important an item with these plants. Be sure to begin with a clean pot; then take some clean broken potsherds, place the larger pieces at the bottom over the hole, and fill in the chinks with the smaller ones. Very few plants can dispense with proper drainage, especially the delicate growers. The earth will get sour and sodden and the plant will fail to grow.

Never try to take up old verbena plants. It will not be worth while to bother with them. Rather root fresh cuttings and keep them over winter. They grow quickly and do much better.

To succeed with the *Clematis Jackmanni*, it must be well pruned. I know of a man who cuts his Jackmanni down to the gronnd every fall. During the next summer his vine will grow from ten to twelve feet high, and it will be covered with one mass of bloom.

THE FIG may be easily grown as a window plant, but certain rules or directions should be carried out when the leaves have all fallen, and the wood is well ripened, which will be generally about the middle of October. The plant should be washed, brought indoors, and placed in a warm, well-lighted window. It will seem to make no progress towards growth, and there will be many who will become discouraged; but if they would have a pretty fig tree with good genuine figs on in the summer, they must keep the little tree over in a warm, light place during the winter, even if it takes the best window. In March the plant will begin to show signs of growth, when commence watering with tepid water; never let the soil become dry, neither take the other extreme of keeping the earth fairly sodden or stagnant. Keep the leaves clean by syringing them frequently, especially on the underside where the red spider is liable to lurk. As soon as there are six good leaves on each shoot, the shoot should be pinched back. When the weather becomes warm the tree should be put out of doors where the sun is hot and in every warm shower. When the plant gets large enough for an eight or ten inch pot it need not be repotted oftener than once in two years. But take off the top soil and add fresh soil and a top dressing of ground bone and wood ashes. When fruit begins to swell, give liquid manure occasionally.

THE DRACÆNAS are very ornamental plants for house culture; they are easily grown, and are exceedingly graceful, standing well the hot dry air of our living rooms. The plants need repotting every spring and fall. During the winter the leaves should be wiped off with a damp sponge, as often as the dust accumulates on them. They need some sunshine, to bring out the colors, and require considerable moisture. *Dracæna terminalis* is very beautiful, with its long leaves of a dark crimson, marked lengthwise with a lighter pink. *D. superba* has pendulous arching leaves of a bronze-green shade, striped and margined with crimson. *D. angustifolia* has leaves fifteen inches long and one inch in width, the margin being of a rose color. The leaves of *D. Baptistii* have narrow irregular stripes of cream and pink. *D. Goldieana* is one of the most splendid. It has broad leaves of a pale yellowish green, with dark green markings.

If fresh cuttings are allowed to wilt once before planting and watering them, they will have suffered much damage.

Try to have every plant a specimen; it is always well to aim high.

FORGET-ME-NOTS make nice winter plants, but they require heat. They flower best in a cool, moist atmosphere. Direct sunlight is not essential, but a little does no harm. *Myosotis dissitiflora* is a very desirable white-flowered variety.

THE BERRIES from the mountain ash may be dried for for winter use, by tying the bunches together and hanging them with the berries downwards.

HYACINTH BULBS do well in hanging baskets.

FERNS are rarely troubled by any kind of insect.

OUT-DOOR CULTURE OF CARNATIONS.—The carnation, so greatly admired by all when cultivated in the greenhouse, may also be successfully grown out of doors during the summer. The best way to grow these plants is to obtain small thrifty plants, or well-rooted cuttings, and set them out the first of May, or earlier if the ground is dry, planting them about a foot apart. Do not disturb the earth around the roots when transplanting, as it would set them back very much. Carnations require a cool temperature, and the young plants will stand quite a severe frost without serious injury, but they do not like too much moisture. If the ground is too wet they will almost surely fail to grow satisfactorily, if they do not die outright, so be sure to give them as dry a location as possible. The carnation should also have a rich, porous soil.

After the plant begins to show good thrifty growth, it is well to pinch the tops back, as this will induce a more bushy growth, and in time, more flowers.

If a few plants are desired for winter bloom, keep pinching back during the summer, until the middle or last of August, and do not let the plants blossom at all, until safely housed.

THE AMARYLLIS.—All the varieties of the amaryllis are very beautiful and may easily be cultivated. Their principal requirement is an alternate season of rest and growth. To grow them well, supply the plants with abundance of water and warmth. When coming into flower place them near the glass. After they have finished flowering, gradually withhold water, so that by the time they have finished growing, and the leaves are well ripened, the soil will be quite dry, and the bulb in a state of rest.

If amaryllis are wanted for winter bloom, the bulbs must be kept dry during the latter part of the summer, and in the autumn, after this rest, they should be newly potted in sandy loam and leaf-mould. Keep them in a warm place, and when the leaves make an appearance give them plenty of tepid water. By plenty of water I do not mean to drench them, so that the soil grows sour or sodden.

When buying bulbs select those which are solid.

Be sure to provide good drainage for the pots. Very many people do not realize the importance of drainage, and wonder why their bulbs rot and their plants barely exist, and oftentimes the only reason is lack of drainage.

New York. GRETA BEVERLY.

PROPAGATION AND CULTURE OF COLEUS.

DID I simply intend to give instructions regarding the particular manner in which cuttings of coleus should be made, and how treated subsequently, so as to insure their rooting, I would merely say, take a knife sharp enough to cut with ease and remove a branch of any convenient length, paying no attention as to the particular point on the branch where the cut is made. If at a joint, all right; if anywhere between joints, also all right; it will send out roots readily anywhere. Stick the cutting into sand or soil—sand is preferable, because cleaner and easily handled—giving bottom heat or not, as convenient. If there is a nice bottom heat, the cutting will be rooted and ready to pot in five days; if there is none, it may take them about twice as long to emit roots. My article might end here, for without exception, perhaps, there is not a plant in cultivation so easily propagated by cuttings as the coleus.

What I wish particularly to direct attention to now, is the means by which stock, from which cuttings may be obtained at the proper time, can be most conveniently and economically secured, and carried along until required.

Generally stock is provided in two ways; by rooting cuttings early in fall, and by taking up old plants just before frost comes at that season. The plan of making young plants for stock has some advantages which commend it. In the first place, it is very convenient simply to take off a number of cuttings which readily root With very little labor, subsequently, one can pot them, either singly in small pots—three-inch usually—or three or four may be placed in a four-inch pot. Where the economizing of room in the greenhouses in winter is of great importance—as during that season every available spot is occupied with flowering plants — these young plants of coleus are very convenient. They can be stored away in all sorts of places, favorable enough too, but where larger plants could not stand. Hanging shelves, for instance, are just the thing for them. I have, in years past, used a great many of these shelves, although now I am inclined to look on them as very poor contrivances; yet in a pinch, although they may be inconvenient and cost a great deal of labor, they help out wonderfully.

There are cases where it is always advisable to propagate young plants for stock, as, for instance, where the stock of some particular variety is very limited, and it is desirable to increase it as much as possible. To accomplish this, cuttings should be made of every branch. These as soon as rooted should be potted singly, and encouraged by every means to grow rapidly. From them, cuttings may soon be obtained, and these again in turn will quickly yield a crop, the first cuttings being kept and encouraged to produce more wood, from which to propagate again.

Another case where cuttings only should be taken for stock, is when, as frequently happens, the old plants have become badly infested with mealy bug. In general these insects lodge more on the old leaves or in the axils of these than on the younger parts of the plant, therefore by taking the points for cuttings, the insects may be avoided. Cuttings are also preferable to old plants which have grown all summer closely packed together in a flower bed. These are generally so weakened by fall as to be unfit for stock. Old plants have also their advantages, and where a sufficient amount of bench room can be given them for a few months, are, I think, the most profitable. It is always desirable, however, to prepare them, and not be content to take these which have done duty in a bed as a lawn ornament all summer. My plan is to plant the required number in the garden in rows about eighteen inches apart each way, so that they cannot become crowded. They are also pinched to keep them dwarf, and cause them to branch out. Early in the fall, when the nights become cool, usually about the first of September, they are carefully taken up, potted in six or seven-inch pots, and set in the greenhouse, and are shaded for a few days until they make new roots. From that time until the cuttings are taken off, they demand but little attention, unless attacked by mealy bug, which necessitates a good deal of work to keep it in subjection. I do not find it necessary to keep these plants in a temperature higher than from 55° to 60°. The object is not to increase the growth any more than is just sufficient to keep the points of the branches already formed healthy and fresh. In the temperature named very little water is required to keep the plants in good health. A daily syringing overhead is usually sufficient; it keeps the foliage clean, and just enough water drops into the pots to keep the soil moist. Occasionally a plant may not get sufficient water, which is quickly noticed by the drooping leaves, and then a little should be poured in the pot. But the soil must never get very wet, or surely the plants will suffer. In a much higher temperature water may not only be given more freely with impunity, but it is demanded. A strong growth is, of course, the consequence, but this is not always desirable. About the first of January the cuttings, which are usually strong and healthy, are taken off; and as soon as they are rooted the old plants are thrown out. These cuttings in due time furnish others, so that by the first of June, when we can begin planting out, there is no trouble in obtaining, as we do, ten thousand strong plants in four-inch pots from one hundred and fifty old plants taken up in fall. After experimenting with old and young plants for stock for many years, I prefer, under the circumstances recited, the former.

JAMES CURRIE.

Milwaukee, Wis.

EXPERIENCES WITH ONIONS.

SOME FIELD NOTES AND OBSERVATIONS OF VALUE.

SOILS AND MANURES. — The onion needs a rich friable soil, one which is easily worked and which never bakes. Well drained alluvial soil or thoroughly subdued muck is best. The difficulty of caring for a crop on hard stony ground, is of itself sufficient reason for not planting on such land, even if a good crop could be obtained. Analysis of onions show that they make similar demands upon the nitrogen, potash and phosphoric acid of the soil; consequently they require a complete fertilizer. When plenty of good stable manure can be obtained at a reasonable price it is unnecessary to look for anything better. It is more suitable and sooner available if well rotted, but do not be afraid of good fresh manure if not so coarse as to prevent being well plowed under. It needs to be thoroughly incorporated with the soil, and quite likely this has much to do with the fact that the crop often does better on the same ground year after year, than on new ground. This practice is fast giving away, however, for growers are beginning to learn that new ground in the right state of fertility and cultivation produces better crops. An old pasture plowed the season before to bring it into good condition makes a favorable location. It is found advisable, in some cases, to alternate with a green crop, German millet being the favorite, to free the land from weeds, spores and insects, leaving it fresh and healthy for onions the following year. A coarse soil not thoroughly subdued or one lacking in fertility, tends to produce scullions. Late sowing and neglect in weeding also favor this form of growth.

My practice has been to apply manure in the fall or winter and plow it under in the spring, but many spread the manure after plowing, only harrowing it in. The onion is generally considered to be a shallow rooted plant, and the advice is not to plow deep, but I have found equally good results from rather deep plowing. In a study of root growth at the New York State Experiment Station, it was found that the roots of a young onion, the size of a cherry pit, extended to a depth of sixteen inches.

Be sure that you do not spread your energies over too much ground. An amount of manure and labor which rightly applied to half an acre of land, should yield 100 per cent. profit, if expended on one acre may give only loss

Sowing.—Onions are propagated as follows: 1, seeds; 2, sets; 3, top-sets or top-onions; 4, multipliers or potato-onions; 5, rareripes. The first two methods are the most common and important, though the potato-onions are valuable in some sections, especially farther south.

First, get good fresh seed, then sow just as early as the ground can be got in condition. This is important to secure sound, firm onions. The sowing can be more easily and quickly done with a seed-drill, but it is easier to care for the crop if the ground is marked both ways and sowed by hand. This is seldom done. The weather is generally uncertain at that season, and when the land is fitted it is desirable to get the seed in as soon as possible, for a storm may come and the ground not be in a condition to touch again for two weeks; besides, the yield is not quite so much per acre when sown in hills far enough apart to be cultivated both ways. Sow in drills thirteen inches apart, at the rate of about four pounds per acre. Most writers recommend more than this, but with good seed and soil in the right condition this is sufficient. My experience has been that with good seed I often get them too thick, but never too thin. If for sets, sow very thick, thirty pounds per acre, for they are better if they do not grow larger than one-half inch in diameter. These are used mostly by market-gardeners, for producing "bunch" onions. If sets tend to run to seed, roll down the tops with a barrel.

Subsequent culture.—It is very important to keep ahead in cultivating, for if by any neglect or inability the weeds get a start it will not only double the cost of weeding, but seriously injure the crop. Two seasons past I have used a small hand drag, made of strips of board with ten-penny steel nails for teeth, for the first work in the way of cultivation, and find it beneficial. Begin the use about one week after sowing and continue until the onions are well up. It breaks the crust of the soil, destroys many of the weeds just germinating, and in no way injures the onions. Frequently stirring the soul assists the crop throughout, and at no time after the plants are well under way can it be done so cheaply as before. As soon as the plants can be plainly seen, begin work with the wheel-hoe and weeding. For land free from stones, I have seen no wheel-hoe which I like as well as Gregory's "Finger-weeder." I have also used the "Firefly," which is an excellent general purpose hoe. Three hand weedings are usually sufficient, with perhaps one or two extra workings with the wheel-hoe or scuffle-hoe.

Harvesting.—Onions from sets are generally pulled when half-grown, bunched and sold for "green onions," as the market demands.

Pull the field crop when most of the tops are dead, pulling four rows together with the tops all one way; returning, lay the next four rows with the tops in the opposite direction. This facilitates the topping, the onions being thrown to the left as topped, bringing eight rows together in one windrow. The topping is best done with sheep-shears. The bulbs can be pulled quicker by running the wheel-hoe under the rows, then raking them together with a garden rake; but the time is lost again in topping. This should not be done until the onions are thoroughly cured. It is useless to cut off a top so long as it shows any green color, for the bulbs will immediately grow and soon spoil.

Marketing.—The green onions must depend principally on a retail market, but the main crop is a more staple article of produce and is largely handled in barrels or bulk, like potatoes. With these, like everything else, a good market is one of the most important points.

Storing.—As a rule, the best way to store onions is in cash. If for any reason it seems otherwise, they may be kept in a cool dry cellar, well exposed to the air, if the onions are of good quality and well cured, but if they are large, with coarse necks, the task will be a difficult one. The plan generally recommended is to put them in some cool loft, where they may be covered and kept frozen until spring.

Varieties.—The Yellow Danvers and Red Wethersfield are the most reliable for market and profit. The latter is a little later, and I am inclined to think a little more difficult to cure and keep. White onions sell best in market, but are not good keepers, and the hot sun is apt to turn them green.

Seed growing.—Select well matured, best shaped bulbs in the fall, and carefully carry them over the winter, planting out early the following spring, setting in furrows four or five inches deep, to prevent the tops from tipping over when grown; cover gradually. A method recommended by Joseph Harris certainly has the advantage of being easily done: prepare the ground and set the bulbs about October first, giving no further attention until the following spring. Keep seed onions well cultivated, and when the seed pods begin to crack, cut off the heads with a few inches of stalk, and spread in an airy place to dry; then thrash and clean with a fanning mill. If further cleaning is necessary they may be sunk in water. The seed is unreliable the second year, hence varies greatly in price, as it is difficult to grow good seed some seasons.

Enemies and diseases.—The worst enemies are the maggot and the blight or mildew. The former does not often cause serious loss, but the latter is very destructive. No well established remedies are known. I have heard that sowing radishes with the onions partially protects them from the attack of the maggot, the insect prefering the radishes, but I cannot verify the statement. It is to be hoped that the Bordeaux mixture may prove a check to the blight. The most practicable remedy is rotation of beds.

Profits.—Sometimes there are no profits, and sometimes they are good. With a crop requiring so much labor, if from any cause there is a failure, the loss is considerable. To show the range in my own experience, I will give my poorest and my best results. In 1889, from three pounds and one ounce of seed I got but 175 bushels, the most of which were so small as to be scarcely marketable, and owing to this and the carelessness of the one in whose hands they were left for sale, I did not get enough to pay for harvesting and drawing to the railroad. This is an example of what the blight can do.

The cost was about as follows:

Manure	$14 00
Rent of land	10 00
Seed	5 50
Fitting and sowing	3 50
Hand dragging	$ 0 75
Three weedings	34 25
Pulling	5 75
Topping	8 25
Picking up and moving to railroad	9 25
Total	$91 25

In 1888, from two pounds of seeds, I harvested 260 bushels, which sold at 60 cents per bushel, or $156.

The cost was as follows:

Rent of land	$ 5 00
Manure	8 00
Seed	5 00
Fitting and sowing	1 50
Hand dragging	25
Three weedings	14 25
Extra work with wheel-hoe	75
Pulling	4 25
Topping	6 75
Picking up and drawing	8 25
Total	$54 00

Deducting this from $156 leaves $102 profit, or $188\frac{8}{9}$ per cent. on the investment. The crop occupied a little over one-third of an acre, making the yield at the rate of 700 bushels per acre.

In conclusion, I may say that the most important points in onion culture are: 1, Rich land well manured; 2, good seed; 3, early sowing; 4, clean and frequent cultivation; 5, a sure market.

Pennsylvania. FRED. W. CARD.

SEED WARRANTY.

IN PAGE 480 of the August number of THE AMERICAN GARDEN I notice an article by "Seed Grower" upon the law of warranty in regard to seeds sold that fail to germinate or to produce such results as the purchaser has a right to expect.

Laws are said to be based upon justice and common sense, and probably for this reason the framers of the law of warranty, assuming that every seed grower was honest till he had been proved otherwise, and that the majority of seed growers were liable to blunder in their many various ways of seed sowing, saw the justness of freeing the seedsmen from the losses likely to arise from the failure of crops, due in many cases to the ignorance of the sower.

Now, when I try any special brand of fertilizer and it fails to produce any marked or even visible result, I do not for a moment think of using this as a claim for damages. I naturally look for the manufacturer's guaranteed analysis at a certain date and compare it with the analysis made by the government. If these are satisfactory, I am content to believe that either my soil does not require the fertilizer, or that it will, at some future time, be benefitted by it. Having sustained, at various times, heavy losses through the use of what I know to have been dead seed, I instituted a series of seed soil tests for my own use, following these up from time to time by submitting the same to a Government Experiment Station. I satisfied myself that, in a way, the vitality of seeds could be dealt with very much in the same way that fertilizers now are. Most seedsmen advertise that their seeds are tested. Now, of what possible value can this piece of information be to the general public, unless the actual result of the test is stated? Others assert that the unsold seed packages will be "cremated" in the presence of the retailers at the end of each season. What guarantee is this that the cremation should not have taken place years before? If the law cannot provide that the purity and productiveness of seeds be secured, it certainly can, and I believe ere long will, insist that all seed packages be dated, and that the seeds therein shall have been tested and guaranteed of a certain percentage of vitality, whether it be 30, 60 or 90 per cent. up to a fixed date, say to the time when the catalogues are being prepared, and sold at prices in a corresponding ratio to the percentage of vitality. This, I believe, would be the means of insuring confidence and coöperation between the seedsman and sower. It would give the seedsman a safe and honest standard on which to base his warranty; it would insure the sower from the losses which he now too often has to endure, and it would do much in causing better methods to be adopted in preparing the ground for the proper seed. W. A. HALE.

CHINESE GARDENING.

INTENSIVE GARDENING AMONG THE CELESTIALS.

THE GARDENS of the Middle Flowery Kingdom are of less importance than its gardening. China is a vast garden, and so appears to the eye, the landscape containing no meadows or pastures or fences or hedgerows. The plots of land are treeless, but broken by raised pathways in which many trees are seen growing, and scattered here and there are pleasant villages of whitewashed houses, prettily embowered. Nevertheless, one who knew the country well wrote of it: "Elegance or ornament, orderly arrangement and grandeur of design, cleanliness and comfort, as these terms are applied in Europe, are almost unknown in Chinese houses, cities or gardens."

There are, indeed, gardens like that owned by a country gentleman of Ningoo, into which one passes from the dwelling rooms of the residence through apparently subterranean passages, revealing here and there courts planted with dwarf trees, and graceful creepers overhanging little pools—gardens of dwarf trees, vases, ornamented lattices and beautiful shrubs, mingled with winding, rocky passages, in such fashion as to deceive the judgment regarding the extent of the grounds. But even in these the rapid decay of the unsubstantial mason and wood work, unless constantly repaired, soon results in a ruinous appearance. It is strange that in that country where government, customs and the organization of society are most enduring, villages and cities should be so insignificant, buildings so unsubstantial, and the appearance of everything have a temporary and partially decayed air. For in China it is the *method* that endures. Its gardening, like its civilization, is less the result of individual enterprise than of a vast accumulation of experience obtained by five thousand fairly peaceful, toilsome years of social and national existence.

The tools used in cultivating the ground are primitive, the implements of ages past, perhaps ruder than the ploughs and hoes of earliest England; but the methods of cultivation are, in some regards, in advance of even our own. Perhaps one-fourth of the entire cultivated land is made to produce two crops in the year, a portion of it three crops; and fallows appear to have been almost if not entirely banished by the careful economy which makes use of all known manures, using even the burnt firecrackers of the feast of lanterns to fertilize the fields, not to speak of less pleasant forms of waste nitrogenous compounds.

Williams, in his excellent "Middle Kingdom," estimates that the cultivated land per inhabitant is, in France, $1\frac{1}{2}$ acres; in Holland and in China, $1\frac{4}{5}$ acres, which the duplication of crops in the latter country may be said to increase to $2\frac{3}{4}$ acres.

Such facts are highly important to a comprehension of the merits and the defects of Chinese gardening, and by their light we are able at once to appreciate what these busy millions of gardeners have accomplished, and also to see wherein they have failed of success in their long ages of industrious toil.

The country is a vast vegetable garden, and almost every variety of edible vegetable production is in use on Chinese tables. Rice is the staple, and two crops are commonly gathered, after which, in some provinces and near the cities where land is valuable, a winter crop of sweet potatoes, cabbages or turnips is raised upon the rice plots. Apparently the aim of the gardener has been to keep the ground in constant use rather than to obtain a large crop or improved varieties; for we are told that the Chinese vegetables are usually inferior in size and flavor to those found in our markets. The sweet potato is the common tuber, and the many sorts of beans hold pre-eminence among the important vegetables, notwithstanding the almost universal use of garlics, onions, leeks, etc. Every growing edible is used for greens: pigweed, purslane, clover, ailanthus, as well as lettuce, spinach, celery, ginger and mustard; even green ginger is used as a vegetable. The variety of cucurbitaceous plants extends to twenty, and aquatic roots, nelumbium, etc., still further enlarge the list of vegetable dishes. In the Chinese Herbal, kitchen herbs consist of five families, containing 133 species, some parts of each of which are eaten.

Without attempting in this short paper to enter upon more than the outlines of a subject of so many details, we may turn at once to certain practical lessons to be drawn from China's vast experience in gardening, and in the use of garden products.

1st. We are told that the Chinese agriculturist manures the plant rather than the soil. He obtains his fertilizers by making economy of fertilizing compounds a first principle, to the disregard of many other important considerations. Canon Gray tells us that some of the prettiest women he saw in China, each with a flower in her hair, were those engaged in the removal of night soil from the streets. If such a result is desirable, then Chinese civilization is as superior as that conceited people claim it to be.

2d. Chinese success in gardening has given the country its vast multitudes, but has deprived them of cattle, milk and bread. There is said not to be an acre of land sown to grass in all China. If we desire a vast population composed of peaceful, conservative people, industrious, but without that energy of mind and character which has always distinguished our race, we have only to adopt China's mild vegetarianism, and develop the garden and the orchard rather than the field and pasture. At the bottom of national character lies, as a physical basis, the diet—not simply the diet of the people, but of its generation.

3rd. The best results obtained from the garden, as contrasted with the field, are not the economical ones—the production of more mouths to feed nor of more hands to labor—but its æsthetic ones: the love for and enjoyment of flowers and all natural objects, and the simple delight in the every-day hues of the beauties of the growing world.

Those who doubt the existence of such sentiments among the millions of Asia should read the Chinese ballad of the Tea Picker, which is sung by the young girls and women who pick the tea in the tea gardens on the hills of China. There is much in Eastern art, and something in its literature, to indicate that even as regards the swarming myriads of China, the poetic influence of gardening has been the purely successful one—producing a good result without alloy.

4th. Regarded in its economical aspects Chinese gardening may be called the successful failure of vegetarianism. The result has been accomplished, the feeding a vast population on vegetable food; for while quantities of fish and other meats are used in China, the diet is sufficiently vegetarian in character to make the country an example of what that cult would persuade us to accept. The aim of agriculture is not to produce the greatest amount of food, but the best food that can be produced. The aim of gardening is not to make life possible on an acre of ground, but give the energetic mind and body what it needs to supplement the other foods and employments and recreations of an active life. It is not so much on economical grounds that we are to urge for every laboring man, however poor, the possession of a little plot of land; rather are the reasons those which have to do with the spiritual existence of the family, especially the children. We do not need to make it easier for the poor and miserable to breed poverty and misery for another generation, but it should be our effort to make the home and family life of every household the best possible, and especially to bring to it the good influences of the garden and of the natural world, to the love of which gardening leads.

A study of Chinese gardening does not indicate that we have made a mistake in our apparently wasteful method of using the earth, but the fine taste in artistic forms and colors, the simple and widespread enjoyment of the natural world, which more extended knowledge of Eastern nations shows us to be the posession of even the common people, have a most important lesson. We have failed to get into our very blood that love for nature and nature's forms and coloring that has somehow become an inheritance with these eastern millions. We exaggerate and are sentimental where they enjoy so simply and quietly that we are hardly willing to credit them with any feeling whatever. But however little intensity there may be in the feeling of the Chinese and Japanese for nature, their arts give the plainest evidence that we have much to learn from them.

That love of flowers which causes the boat-women and even women scavengers to wear them in their tresses*, and the tea-pickers to sing at their work—

> "My wicker basket slung on arm, and hair entwined with flowers,
> To the slopes I go of high Sunglo, and pick the tea for hours—"

this simple enjoyment of natural beauty may have done more for the world than we have supposed, and it may be precisely the influence that our own population needs. The preaching of the pulpit, the service of the church, the work of the school, are all easy to estimate, but those quiet, uplifting influences that flow into the responsive heart from the natural world, who can tell their transformations? Even amid dark superstitions, the millions of China have at least the gentle light of the silent world of nature, which gardening has taught them to love.

THE FRUITS OF CHINA.

The apples of China are dry and insipid; the plums, quinces and apricots afford better varieties, and two pears, the White and Strawberry, are said to be equal to any western varieties. The fruit of the south is the orange, the most delicious species being the *chu-shakin* or mandarin orange. The olives are inferior; dates were formerly abundant, but are now but little cultivated. Four of the indigenous fruits are the whampe [cookia] a grape in size, a gooseberry in taste; the loquat, or pebo [eriobotrya], a kind of medlar: and the lichi, a strawberry in size and shape, the tough red skin enclosing a sweet, watery pulp of a whitish color surrounding a hard seed. The pomegranate is cultivated chiefly for its flowers; the guava and the rose apple are grown to make jellies: bread-fruit, almonds, mangoes, bananas, the persimmon and the carambola, or gooseberry-tree, are also cultivated. A pleasant sweetmeat like cranberry is made from the seeds of the arbutus [myrica]. The citron is valued more for its fragrance than its taste, and the thick rind is cut into strips while growing, each strip becoming a roundish end like a finger, whence the name *Fun shao*, or Buddha hand.

Grapes are abundant and cheap, and in northern China are kept through the winter by carefully regulating the temperature of the fruit; a system akin to our "cold storage," which is practically new with us.

(*) The flowers grown in pots on the boats, and those usually worn by boat-women in their hair, all assist in imparting a pleasing aspect to the river at Funchau. The jasmine is the favorite flower for the hair. The cypress vine is found trained about the homes of even the poorest people.

AUTOMATIC VENTILATION.

A NUMBER of letters have been sent to the editor of The American Garden asking for more information concerning the automatic greenhouse erected by Mr. Charles Barnard, of Stamford, Conn., and in an interview Mr. Barnard gave further particulars of his experiments.

"We first took out one of the lights of the middle sash, and over this opening placed the wooden trunk and chimney described in the October number of The American Garden. At first we had no valve as seen in the illustration on page 611, and in place of this we had a metal valve, taken from the top of an old incubator. The first experiments were with apparatus already used to ventilate the incubator. We took the entire apparatus—thermostat, cranks, rods, valve and connections—from the incubator, and by turning them around in another position fitted them to the underside of our ventilator. The thermostat was of the rod type, the rod being covered with rubber. We made a new frame for the rod, and then hung it just under the glass at one side of the ventilator. It was then an easy job to connect the bar with the arm that operated the valve, and once set up, the apparatus worked to perfection for many weeks without a single failure.

"The whole thing was simply an automatic ventilator taken out of an incubator and fitted to a greenhouse. Of course, the house was many times larger than the incubator, and it would seem impossible to use it to advantage. Practical, daily experience through many weeks showed that it would do the business. It can be explained in this way. The thermostat (as in all incubator thermostats) could be adjusted to various temperatures, and we set it to operate in the full sun at the very top of the house at 80° Fahr. It proved to be very sensitive, and the valve began to open very soon after the sun shone upon the thermostat. At 85° the ventilator was wide open. At 83° it would begin to close, and at 79° it was closed tight.

"The result was that the heat was released the instant the house became too warm, and the warm air went out in a swift and steady stream all the time the ventilator was open. The smoke from a lighted match held at one end of the house would travel along under the glass and curl up into the ventilator, while a candle flame held near the ventilator would be bent out of shape and lay horizontal with the point to the ventilator. The secret of the successful working of such a small ventilator seemed to be in the tall chimney over the valve. No cold air could get down into the house, and the hot air was swept out as fast as it gathered. A passing cloud would cause the ventilator to close, and it would open again within two minutes of the return of the sunshine. The thing was a real and practical automatic ventilator, and kept the house at an even temperature for many weeks without attention.

If two or, perhaps, three such ventilators had been put in we would have had no further trouble. In February the sun became so powerful that the heat would accumulate faster than the ventilator could carry it off. We then made a larger opening in the glass and put in a larger chimney with the valve shown on page 611. To operate this valve we made a thermostat according to the following description taken from the *Scientific American*." (See Figure 1.)

"The instrument depends for its operation on the difference between the expansion of brass and steel. The linear expansion of brass is nearly double that of steel, so that when a curved bar of brass is confined at the ends by a straight bar of steel, the brass bar will elongate more than the steel bar when both are heated, and will, in consequence, become more convex.

"At 2 are shown two bars, the straight one being of steel, the curved one of brass. The steel bar is slit for a short distance in two places at each end, and the ears thus formed are bent in opposite directions to form abutments for the ends of the curved brass bars, two brass bars being held by a single steel bar, thus forming a compound bar,

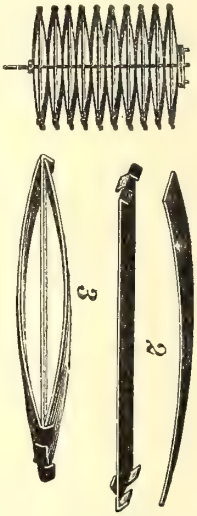


Fig. 1.
Details of the Thermostat.

as shown at 3. Each compound bar is drilled through at the center. Ten or more such compound bars are strung together loosely upon a rod, which is secured to a fixed support. A stirrup formed of two rods and two cross-pieces rests upon the upper compound bar and passes upward through the support. Above the support it is connected by a link with a sector lever which engages a pinion on the pivot of the index. The use to which the thermostat is to be applied will determine its size and construction. It may be used in connection with kilns and ovens and for operating dampers, valves and electric switches.

'We made our thermostat with three springs only and hung it on the outside of the sash in front of the ventilator at a cost less than one dollar for the material. By means of bell-cranks and rods it was connected with the valve and caused it to open and close.

"From our experience last winter it would seem that a thermostat and ventilator taken from the top of an ordinary incubator can be made to ventilate about 100 square feet of glass through December and January and about 50 square feet in more sunny months up to April 1st. Two sash ventilators in an 18-foot house would be sufficient, one for dark months and one for lighter months. The large valve we used in March was too large for December, January and February. There seems to be no reason why such ventilators cannot be procured from the makers of incubators, and be used in greenhouses, giving one ventilator to carry 100 square feet of glass. Of course, the makers of incubators could supply larger ones by simply making new patterns for their ventilators and valves, and using the same thermostat and fittings."

Following up Mr. Barnard's most interesting achievements, the editor of the GARDEN is also experimenting with automatic ventilation, and some account of the results may be expected next month.

HOW I GARDENED.

BY HELEN A. STEINHAUER.

CHAPTER I.

LIKE Mrs. Gummidge, of plaintive memory, "I am a lone, lorn critter," but, unlike her, I am not a widow. Rupert is an abiding presence in my home; but, dear heart! when the highest aspiration of of the man of the house is to look pretty and play his flute, the only thing he ever was known even to attempt doing, is it a wonder if the feminine head of the house occasionally feels lone and lorn in view of the fact that she has to be "captain, mate and crew" turn about and all in one?

Still it was with a fair amount of courage that I, this spring, attacked the garden.

We had not tried to have any last year, but when, at the end of the season, I had to pay our green-grocer's bill out of my pen-money, I, who have to do all the tugging and stretching at both ends to make them meet, thought that this year we had better raise our own vegetables.

Rupert manifesting his usual unconcern, I went ahead in my womanish way. Night after night I pored over catalogues, while he petted his flute. At length I made out a list from the, to me, most attractive catalogue, viz.: that which was daintiest and most artistic in its make-up, and which promised the most tempting novelties.

Potatoes were ruled out of the list, as neither of us care for them, and I well knew that I should, single-handed, have to care for the potato-bugs.

Cabbage neither of us ate; ditto beets, turnips, carrots, parsnips, etc. If I turned gardener I would have the things I liked best, and plenty of them, I inly resolved. So down went sweet corn, pop corn, sugar peas, winter and summer squash (all of the most marvelous and enticing varieties), Tomhannock lettuce, White London mustard, curly cress, round-leaved spinach, large-leaved dandelion (I so love greens!), also vine-peach and ground-cherry, "which no garden should be without," and salsify for use in early spring. Of the new tomatoes, I selected the Golden Fig, Peach and German Raisin. Russian cucumbers I must have for salad; early radish-onions for eating raw and pickling: also egg-plant and White Velvet okra to remind me of my native south.

At this stage I fancied I saw Rupert fixedly eye my lengthening list, although fingering his flute as usual, and, also as usual, saying never a word. So, as I myself thought I had about all I could well cultivate, I merely added some of the extraordinary fruits, such as everbearing blackberry trees, tree currants, Japanese wine-berries, Russian everbearing mulberries, with a few melon pears of Pepino, Japan pears, and new Russian apricots; also some Mammoth dewberries and one Chinese quince.

I came near denying myself flowers altogether, knowing how lightly Rupert esteemed them. But just then a vein of self-assertion cropped out, and saying, "If I have all the labor I will also have some of the gratification," I deliberately set down White Swanley violets, double purple ditto, Excelsior pansies, evening primroses, rose-bud poppies, lilies of the valley, sweet peas, candle cactus, mignonette, etc.

Was it a wonder that Rupert, long-suffering though he is, looked black? But neither of us spoke; we have petted the two bears, "bear" and "forbear," ever since we became a family of two, and we never have words between us.

Our garden plot consists of a lovely patch of coarse, yellow building sand, part of a vein that is fifteen feet deep, I am told, and, as I can testify, with but six inches of mould by way of coverlid.

I had sense enough to know that ordinary enriching would not supply the deficiencies of such land, but a lucky "adv." from dear, old Boston-town (precious hub of the universe! autocratic town of the Americas! what should we do without thee—to what demand art thou not equal!) promised a lawn-dressing and garden fertilizer which claimed to produce a rich growth of grass on pure sand, and to furnish plant-food for vegetables on the most unlikely soil, besides being clean, odorless, pleasant to handle, free from weed-seed, insect-larvæ, death to fleas, worms, grass-hoppers, caterpillars, bugs and moths. In short, desirable from every possible point of view; and, to cap the climax, delivered at your very door absolutely free of charge.

Surely here was the chance of a lifetime for an amateur horticulturist! Thankful that there was neither use nor need of consulting Rupert, I quietly ordered a quantity sufficient to make lawn and garden the envy of all beholders, and mailed my letters, rejoicing thereat.

With gratifying promptitude the orders were acknowledged, and promise given of speedy sending of the goods. I have ceased talking to Rupert, but I sometimes think aloud, and so it came to pass that one day he overheard me say: "If I *don't* know anything about out-door work, I still shall have a garden which will be a credit to me. So much for keeping posted and abreast with the times!"

CHAPTER II.

Snow was on the ground when I ordered my sinews of work; but winter had given place to spring, and summer was at the door, before my seeds came—but no fertilizer!

I promptly sallied forth to find a man with a horse to plough my 2 x 4-rod garden.

After long search I found *two* inseparables (one could not come without the other!)—and their team, making four; who charged by the hour for their several selves. The quartette were fairly occupied, as the horses and one man ploughed, while the other man diligently helped and ordered, and both men talked pleasantly; filling in the time to their mutual satisfaction, so that I had no idle moments to pay for. True, one man and one horse would have answered my purpose full as well, for the soil was light—and they would have cost less—but in view of the results, which were so certain, the extra expense became a small matter and was paid without demur.

Heavy showers had prevented the men from doing all I wanted them to do, so I the next morning rose at four and amused myself by laying out the beds and planting my seed; a pastime which occupied me till 1 P. M., necessitating a hurried breakfast and a cold dinner. But Rupert, with characteristic amiability, did not complain, and I was recompensed by the thought of work well done—albeit unaccustomed toil.

The only damper to my light-heartedness was the fact that the fertilizer which was to be the specific for all the natural draw-backs of the soil had not arrived, and consequently could not be worked in prior to seeding. Moreover, my plants had not come.

Our garden, Rupert's and mine—I am not a strong-minded woman, dear reader, if I have grown brown and horny-handed from toil such as American ladies are rarely called upon to perform—our garden lies on a sunny (*very* sunny) western slope. The drainage is unsurpassed; and I facilitated it still more by running my beds from east to west, leaving the most charming path-gutters, or ditches, between them. Hence the next night when one of our Michigan deluges fell, Rupert heard me gently murmuring in my sleep the query as to whether it might not have been wise to have had our lot terraced, so as to have had both yard and garden level ground.

And daylight proved the correctness of my thought, as on prospecting in the morning the neatly laid-out garden was found to have become a series of longitudinal stream beds with only slight dividing ridges, which bore small resemblance to the original sightly beds.

I had not much appetite for breakfast that day; still I sang at my work as usual.

The few seeds that were not washed out did their prettiest, as it was fine growing weather. But after a few days the brave young plants began mysteriously to disappear, leaving only gaping holes to show where they had been. Sorely perplexed, I scrutinized my poor garden until I found out the cause. Nimble black fleas and sage-green catapillars, with frisky grasshoppers, devoured them root and all, while a still more disgusting depredator in the shape of a black and green striped worm an inch and a half long and half an inch thick, foraged on the tender roots of the tomatoes, cutting them off by wholesale.

Ashes suggested themselves as the likeliest remedy. But, alas! gasoline stoves furnished none, and winter refuse had been removed long, long ago. Ah! happy thought, why not try my fertilizer? It had arrived at last, though not free of charge, nor yet grumbling on the part of the man who brought it, and who actually forced me, a woman, to carry it in doors, for "fear lest handling it might hurt his hands!" I think he must be related to my indolent Rupert.

Yes, doubtless by sprinkling it on the once shapely beds I should be able at one and the same time to enrich the soil and destroy all insect life. So with a fresh accession of courage I sallied forth to make war against my lowly foes, armed with a pailful of the promising stuff, and a tin dredging box by means of which I impartially peppered my entire domain.

The asparagus, chicory, Tomhannock lettuce, salsify, round-leafed spinach, egg-plant, White Velvet okra and radish-onions on which I had especially set my heart, entirely failed me ; but the peas had come up fairly. I had two summer squashes, lonely occupants of two long beds ; no Hubbard's ; a few radishes ; no rhubarb ; some mustard, and a few hills of corn. Well, I doctored them faithfully. At sundown I paid another visit of inspection, and found them all *dead* ; scorched as if by fire !

It is uncertain whether I shall have courage enough to try again next year. I talk of seeding down the entire lot to grass in the fall, and planting a few trees · maybe they will live.

My flower seeds shared the same fate as the vegetables. Only candytuft and balsam, for which I cared least, came up. Of the fruits for which I sent, only one Russian mulberry and a tiny tree blackberry came, the last only living long enough to die, their supply of the rest having been exhausted before my turn came.

I think I could bear it better if Rupert cared. But I do not get a particle of sympathy from him. He persists in posing on top of my Magee heater, endeavoring to play that everlasting flute of his, with the most apathetic, indifferent expression on his well-bronzed face. It is too bad !

HORTICULTURAL APPLIANCES AT THE PARIS EXPOSITION.

A TRANSLATION OF CH. JOLY'S "RAPPORT SUR LES SERRES ET LE MATERIEL DE L'HORTICULTURE."

IN 1878 the horticultural exhibits were scattered over the Champ-de-Mars, filling up such places as the industries saw fit to leave vacant.

In 1889 Mr. Alphand, assisted by Messrs. Belgrand and Hausmann, reserved almost the entire Trocadéro for horticultural purposes. At the Trocadéro plantations of ornamental shrubs and fruit trees had been made in advance, in order to adorn the larger vegetation which already existed.

The products for class 78 had been placed—

1. In the two wings of the Trocadéra.
2. In two vast tents, parallel to the fountains.
3. Upon barges of the Seine, where the irrigating apparatus was placed.
4. The greenhouses and the kiosques were scattered everywhere along the walks and in the shrubberies.

As a general observation, the horticultural material did not show, in 1889, much progress. The greenhouses were ordinary structures. One would have wished to see a great winter garden for large vegetation, as in 1867, or at least a house devoted to *Victoria regia*, as a departure from the ordinary forms.

Finally, the almost entire absence of foreign exhibits rendered the horticultural material less interesting than in 1878.

The following are reviews of each of the sections of class 78 :

PLANS OF GARDENS AND THE HORTICULTURAL LIBRARY.

Framed in elegant trelliess, which were fastened along the walls of the Trocadéro, the Plans of Gardens were certainly among the principal attractions of the class 78. Twenty-two exhibitors showed us designs which plainly indicated what transformations a private park can undergo. I should like to have something definite upon which one can base an accurate judgment of the value of the work of a landscape gardener. I mean to say :

1. The plan of the ground given him.
2. The advantage he has taken of it.
3. What he has spent.

I should have liked to see, also, as at other exhibitions, plans of cemeteries, such as they happily give in the United States. Among the plans for public parks we notice several for the Park of Liberty, at Lisbon ; also various transformations of fortifications of cities, or of a public promenade, such as Ed. André has carried out in Luxembourg. Mr. André also showed his designs representing the gardens of Monto Carlo, the works in which he had directed ; his plans of a new city at Bagnoles and his last work on landscape gardening, with the plans, on a small scale, of the porches and gardens which he had superintended from 1878 to 1889.

The art of landscape gardening consists especially in hiding, by plantations, that which should not be seen ; in bringing out points of view by suitable openings ; in artificially enlarging the size of the grounds ; in a word, using only what there is beautiful in nature. Certain sites are sometimes photographed and then imitated in appropriate places.

It is not always easy to judge landscape gardeners by their plans, but in their hands the style of landscape adapted to-day produces the most happy effects. And the park of Trocadéro, under the skilful hand of Mr. Laforcade, was an exquisite model, showing all that is light and joyful in a landscape.

To-day this art is no longer limited, as formerly, to the rather uniform and small foliage of our native plants, so noticeable to all who have seen tropical vegetation. We have imported a host of plants with ornamental foliage, with bright and varied colors, which make of the actual planter a true painter. An artist in landscape gardening must be a botanist, acquainted with all the needs of culture, and he must be able to foretell the tints, the growth and the relative effects of the plants which are to complete and adorn his work.

As to the horticultural library, it was not very complete, but some firms had brought their principal publications on landscape gardening and horticultural methods, and these showed well how much chromo-lithography and engraving have been applied in instruction. In these respects the French library is unsurpassed by any foreign one, and from the most modest treatise to the most artistic books, landscape gardening has resources of all kinds.

There is not a professor who has not published his treatise on arboriculture, each one believing that he has something new. Besides these, one occasionally sees interesting works on palms, orchids and landscape gardening. Horticultural societies multiply, and publish bulletins in which may be found reproduced all that is interesting in botany and arboriculture.

I must not forget to mention the beautiful publications of the firm of J. Rothschild, which had sent a collection of works edited by themselves during the last few years.

PUMPS AND APPARATUS FOR IRRIGATION.

This section, unfortunately placed on the banks of the Seine, did not draw many visitors. The principal exhibitors had also been scattered about, and all we can do is to mention the fact that the apparatus in general is ample to satisfy all the needs of horticulture.

POTTERY, GARDENING AND ARTIFICIAL FRUIT.

The class 78 this time had but few artistic vases. One had to go to the class devoted to tile-kilns to see these. But several firms from Paris and its vicinity exhibited an improved line of pottery, commonly used in gardens. The work is now done by machine, and very smooth surfaces are obtained, which is desirable for potting plants. The price of these articles has also decreased, so that now we can compete with other countries.

We have no artificial fruits that equal those of Germany or Italy. The collection of the Paris Society of Horticulture is still the most perfect, but a worthy successor of the lamented Mr. Buchetel, who is the author of the Paris collection, has not yet been found.

HORTICULTURAL CUTLERY AND HARDWARE.

The cutlery of Paris has maintained its superiority over that of the provinces, not for the price, but for the quality of the work and the utility of the articles. Some provincial cities, such as Vogent, Langres and Thiers, manufacture at a very low price, but their goods are almost always deficient in style and lightness. It is to be regretted that more foreign exhibits in this line were not made.

Our knives and all other hand tools, with few exceptions, are what we saw in 1878, but some rakes and implements for transplanting and transporting trees have been improved. Celluloid labels have been adopted in some large nurseries, but for botanical gardens, one has found nothing better than those which are used at Brussels, viz: a small map of the world, showing by different colors, and also by the usual names, the habitat and origin of the plants, the latitude in which they grow and the countries in which they have become acclimatized.

SCREENS, TANKS AND STANDS FOR FLOWERS.

The number of our manufactures of screens is considerable, and very durable and solid shades are now made at moderate prices; but we are to-day seeking to avoid the use of screens placed directly upon the glass. In placing the covering from six to eight inches above the glass, as with curtains, there is left, between the shelter and the glass, a layer of air which produces an excellent effect. Mats are no longer employed, except by market gardeners, on account of the price.

The manufacture of stands and tanks for flowers has also improved. Several provincial exhibitors displayed excellent goods at very moderate prices. Some had models of devices designed for the examination and removal of plants in pots. This was accomplished by having a movable panel on one side of the pot.

I must also mention fruit carries of various kinds, fixed and movable, which aid in the preservation and examination of fruit. Finally, since orchid culture has so rapidly increased with us, some manufactories for special holders, in open work of pitch pine. have been erected, and these will satisfy all the needs of the culture.

GROTTOS AND ROCKERIES.

The gardens of the Trocadéro enclose some very fine examples of the art of the grotto-maker. For the imitation of nature, resources of all kinds are at hand. First, one can photograph sites from nature, and imitate them. The material for the structure varies very much in accordance with the character of the country and the duration of the work. For temporary constructions like those seen at the Champ de Mars, excellent results may be obtained in imitating natural caverns by nailing wire trellises to a wooden frame, from which projects cement or colored plaster. Ruins may be easily imitated with ordinary stones in appropriately shaded localities. The Trocadéro this time showed some good examples of rockeries and grottos near the pavilion of the woods. One should guard against having too much of this kind of decoration, and the result should always appear natural and in harmony with the surroundings.

GARDEN FURNITURE, TENTS AND ARBORS.

Garden furniture of iron, bamboo and rattan is now made in Paris with exquisite taste; and some exhibitors had brought some interesting things both for the winter garden and for places exposed to all weathers. For the winter gardens, the style of China and Japan is still imitated. Garden chairs are made remarkably cheap, with iron for the parts reqniring solidity, and wood for the seat.

Models of tents and chairs were numerous at the Trocadéro. The portable chairs were especially appreciated by ladies who were obliged to walk far; as to arbors, the models exhibited around the plans of the gardens showed that the art of the seventeenth century still lived.

HEATING OF THE GREENHOUSES.

The circulation of hot water for the heating of baths was known to the Romans, who only employed bronze pipes, which one still sees in the passages of the ruins of their thermæ. Many centuries later, in 1675, Evelyn speaks of heating greenhouses in England by a circulation of hot air; then in 1706, Triewald heated a greenhouse by a heater placed outside, but having hot water circulating through pipes, under the plants.

In France, Bonnemain was the first who, in 1777, applied the circulation of hot water to an apparatus made for artificial incubation. Later he applied his system to the heating of baths and greenhouses; he does not seem to have derived much profit from his works, for on the 21st of May, 1828, Mr. Payen submits a report to the Society of Encouragement, in which he mentions the embarassing circumstances of Bonnemain, and enumerates his claims to recognition by his compatriots.

[TO BE CONCLUDED NEXT MONTH.]

THOUGHTS AT NIAGARA.

IF ADAM and Eve had started in life outside the Garden of Eden, and had subsequently been ushered into it through an opening in a high board fence, at which opening stood a gate-keeper, demanding twenty-five cents each before they might enter to gaze upon the beauties within: if, when once within, vociferous hackmen had clamored for their patronage, vieing with each other as to who should take them "the complete drive about the Garden": if, in short, *civilization* had been there before them, would there have been such great cause for grief when they were finally banished? *Quien sabe?*

If, four hundred years ago, Vasco Nuñez de Balboa, crossing the Isthmus of Darien and discovering on its thither side the vast and boundless ocean, had found his route marked with sign-boards warning him to "prepare to discover something," would he have realized so fully the glory and majesty of that sea when he finally stood upon its shore? *Quien sabe?*

If the first sentient human being who gazed upon Niagara had journeyed to it per railway express; had run a gauntlet of hackmen; had then gone down through a mean street of catch-penny shops; had been stopped by hawkers at the doors of "curio" stores and importuned to buy a thousand and one things that bear no manner of relation to the falls; if he had finally entered to the very presence of the falls through a trim park, guarded by sentinels; found signboards, directing him to the best "points of view," and others cautioning him to "keep off the grass," would he finally have approached the cataract in the calm and receptive frame of mind which enables—and which alone enables—one to become wholly embued with the spirit of such a scene? *Dios sabe!*

If Niagara was ever encompassed and belittled by such drawbacks, we may well pardon the primitive man who beheld it under such conditions, because he could see in it no more than "a big waterfall."

We, who live in a more enlightened age, find it difficult to believe that Niagara ever was beset by such conditions; but history tells us authoritatively that, during the nineteenth century, taste had fallen so low that it was made a "show place;" was photographed, lithographed, advertised, excursioned, *ad nauseam.*

Now, it is sufficient for us to know that Niagara exists, and when any individual of us feels moved to gaze upon its impressive features, we start in quest of it, as did our forebears for the sword Excalibur, or the Holy Grail, or the pot of gold at the foot of the rainbow.

But away back before our time, and before the nineteenth century, with its pinchbeck civilization, and before the primitive man, Niagara existed. And one day an Autochthone, Son of the Earth, wandering the wide world over, came face to face upon it. Now, this was but a poor untutored savage, not a man with our vast development of brain and mind and reasoning power—only a poor being with an instinct. This being watched the mass of falling waters, and instinct told him that was power. He listened to the musical roar of the waters, and instinct told him it was the voice of that power. Standing below the cataract, instinct told him that the waters came from the unfathomable nowhere; and standing above, instinct could only guess that they passed into the infinite beyond. So the being called the cataract a Great Spirit, and fell down and worshipped it.

Now, I wish I had been that being. I admit that he had never heard the falls extolled; had never heard the falls adjectivized; so could form only his own dim conception of them. He had never seen a picture of them; never heard them scientifically or geologically explained; was even so ignorant as to imagine they *meant* something—had some lesson to convey. Perhaps he stood there a long time, the unbroken forest stretching everywhere about, no other presence besides himself and that awful and mysterious spirit of the waters. It did not occur to him that a tourist of enterprise could "do" the falls in two hours, and have ample time then to exhaust the vocabulary of admiring adjectives and quarrel with the hackmen into the bargain. But as I have said, he was only a savage; but again, I wish I had been he! B.

Niagara, A. D. 1990.

The Editor's Outlook.

THE MISSION OF FLOWERS.

IT SEEMS strange at first thought that young children and women and old people should care more for flowers than do boys and middle-aged men, yet it is not strange. The spirit of flowers belongs to the calmer and tenderer virtues, and it is foreign to the restless boy who is fired with indefinite aspirations, and it is apt to find little room for lodgment in the mind of ambitious manhood. But when the years begin to soften passions and ambitions, the first love of the flowers begins to return, and it returns the more completely the more tender and careful the disposition. Youth and old age meet in many ways. It is a fond ideal of artists to picture the child upon the grandfather's knee or frisking by his side through the calm and shady fields. Nature speaks to both, to one in some unknown and strange emotion which inspires a wonder of what the great world is and what it means, to the other with the sweetness and nearness of a friend. Both love the flowers because they appeal to their sentiments and emotions. Life begins and ends at the same point, in purity, emotion and love. To women flowers always appeal, because in them the fundamental affections are less obscured by ambitions and sin. It is a hopeful sign if some of the tenderness and sweetness of childhood remains in the man, if the flowers and nature still retain of their old-time fragrance and wonder. "It is character that counts, after all."

⁂

THE DISCIPLINE OF DIFFICULTIES.

"I REGARD the yellows as one the greatest blessings which ever fell to the lot of peach growers. It has checked the recklessness and inflation which follow uniform success." This bit of heresy was given us recently by a peach grower of large experience and observation in the Chesapeake peninsula. We had ourselves taught that diseases and difficulties which can be readily overcome or can be checked without great sacrifice, are directly beneficial to any community, because they drive out the shiftless and incompetent growers, and because they lessen production, and, therefore, aid in keeping prices within the limit of profit. But we had hesitated to make the same declaration in regard to such serious and obscure diseases as pear blight and yellows, and we had never thought of the discipline of difficulties in checking the recklessness of success. This, our informant assures us, has been true in many parts of the Chesapeake country. It is almost an axiom that the most staid and honest people are found in regions where greatest effort is demanded.

It will be interesting to carry our friend's remark to its logical conclusion. In the first place, difficulties, whereever we find them, are moral goads. The man who does not overcome them must turn out of their way. Therefore, they drive from any business those men who are not staid and courageous enough to oppose and overcome them; they rid the business of an uncertain and therefore unstable element.

Again, difficulties engulf most seriously those who are ignorant of the details of the business or who lack perception and alertness. As a rule, other thing being equal, the most competent men in any business are those who have confined their attention to a comparatively small field. Difficulties, therefore, tend to drive out the general or old-style farmer, and the greater the difficulties the greater must be the exodus.

We cannot escape our friend's conclusions; the difficulties of any business drive out the incompetent and careless, and tend to make specialists. And the more serious the difficulties, the more intense must be the specialization. General and mixed farming, in connection with fruit growing, is constantly becoming less satisfactory.

Specialization is the salvation of our agriculture, for whether we wish to throw the responsibility of present depressions upon politicians or upon the moon, it is still true that the man who is most skillful in a special line is bound to be the most successful. A prominent educator recently remarked to us: "The agricultural colleges are bound to attract more attention from the farmers, for the difficulties of farming are constantly becoming greater. The boys want help."

⁂

FUNGI AND THE STATE.

THE most urgent need of horticulturists in the direction of laws is a statute in every state designed to control fungous diseases of plants. The ravages of the codlin moth, curculio, canker worm and even rose chafer are of minor importance to the destruction wrought by the fungi. The work of insects is tangible and for the most part it is more easily controlled than that of the fungi. The fungous injuries are obscure, and at times they are spread with almost incredible rapidity over great areas. Once established, many of the fungi are invulnerable, and in all of them timeliness is the most important factor in their control. In fact, many of them can be controlled only by quarantine. This is particularly true of peach yellows, which, for practical purposes, may be rated a fungous disease. One who has observed the almost wonderful results of this system of quarantine and rooting-out in the Michigan peach regions, and who has seen the thousands of acres of wrecked orchards in Delaware and Maryland where the disease has been neglected or fought by arguments, cannot for an instant doubt the efficiency of vigorous and concerted effort in the control of plant diseases.

Two provisions need attention in laws to control plant diseases. It should be a misdemeanor for anyone to allow diseases which can be controlled only by quarantine to exist upon his premises. Such diseases are pear blight, peach yellows and black knot of the plum and cherry. Then a contingent fund should be provided to be used in the investigation or eradication of any new disease which may appear, and in disseminating information as to the proper methods of combating specific diseases.

Michigan led this movement by enactment of a yellows law, and New Jersey has made a general law against fungous diseases. European states have undertaken to control them. Every state in the Union should now consider the matter.

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THE OLD-FASHIONED GARDENS.

SHALL we keep the old-fashioned gardens where all the good and simple flowers which we loved in childhood grew in unstinted profusion? Or shall we lead against them a crusade of modern gardening and eliminate them from the land? Some still live upon the memory of them and think that they are the most satisfying types of gardening; others see in them only crudity and conventionalism and would sacrifice them all to present ideals. And there are some who think there are room and occasion for both. We cannot escape the conviction that some of these old gardens are often better adapted to small and country places than our modern creations. Modern gardening—if by that term we mean the application of the principles of landscape gardening—demands a considerable extent of ground for its full expression, or when we apply a few of its principles to a small area, as a farmer's yard, we assume some love of it or appreciation of it in the owner, or some harmony of surroundings which appear to demand it. But the primitive and tangled garden demands no excuse for its existence, and it harmonizes with the time-worn cottage or farmhouse, the genius of sheds, fences and lanes, and more than all, the owners are satisfied with it. Sometime, when the country is older, softer and less picturesque, men may want the greater precision of our truer ideals, but in this generation let us keep some of the tangled door-yards.

There is another type of old gardens which is known by the most exact geometric designs and the closest attention to many details of balancing and condensation. About these there is little to admire, perhaps, for they appear to be too conscious of their own existence. One of our readers thinks the time is come for their extinction, although he lingers upon them with a tender memory:—

"I see it now—a procrustean acre surrounded by a picket fence, a straight walk down the center; on one side vegetables, on the other side flowers and ornamental shrubs; circular flower beds on the right, square beds of beets and lettuce on the left. One might go forth with his eyes shut, year after year, and find the parsnips, the cucumbers, and the onions, the zinnias, the tulips, and bachelor buttons, just where they always grew—a half acre of sentiment, balanced by a half acre of skill. The sweet corn, the melons, and the Lima beans were considered too delicate and extracting in their nature to be exposed to the vicissitudes to which their more robust relatives of the farm were subjected. They must be sheltered within a special enclosure and receive all the resources of the barnyard. No clumsy horse might be admitted within the sacred grounds, save possibly to turn a few furrows in the spring, and even this was looked upon as an invasion of the rights belonging to the spade.

"In like manner the little plot of art across the path was considered too good to associate with the rest of the landscape, planned and planted by nature. Here alone, behind the picket fence, and beneath the exotic lilac bush, might one come if he wished to enjoy to the full his love for the beautiful. There are signs that the old-fashioned garden, with all its memories and pleasant associations, its narrowness and limitations, is passing away. The new conditions of our western life are compelling people to think, even on emotions like this, and it is coming to be understood more and more that natural conditions are more important to be understood than artificial methods in the cultivation of vegetables, and that in the planting of ornamental grounds, adaptation to circumstances and an effort to preserve and supplement whatever is attractive in the natural surroundings will bring most satisfactory results."

FOREIGN NOTES.

A New Egyptian Cotton Plant.—Reporting on the trade and commerce of Alexandria during the year 1889, Vice-Consul Alban refers to the increased cultivation of a new variety of cotton plant, known as Mitafifé, as the chief feature of the year. This plant was discovered a few years ago at Beaha. Although its produce is not quite so good in quality as that of the Ashmouni plant, and is of shorter staple, it produces a much larger proportion of cotton to seed than any other variety; at the same time it has the advantage of being earlier and less susceptible to atmospheric influences.—*The Gardeners' Chronicle.*

⁂

Yellow Tuberous Begonias.—Amongst the four dozen new double begonias I have this summer had under view are three most beautiful yellow flowers, which, each from a different point of view, leave little, if anything, to be desired. Two of these came from M. Felix Crousse, of Nancy, and are named Source d' Or and Toison d' Or, and the third, the largest flower of all, more resembling a double hollyhock than a begonia, comes from Messrs. Cannell, of Swanley, and is named Mrs. Jenkins.—*W. E. Gumbleton, in The Garden.*

⁂

New Dahlias.—Dr. Peters.—The flower heads of this new cactus dahlia are of medium size and crimson, shading off to yellow at the tips of the florets, but even there a tint of crimson is more or less evident in some cases. The florets are oval and slightly grooved, or nearly flat. The heads Black Prince, another new cactus variety, are of large size, and velvety blackish maroon. The florets are also large, loosely arranged, broad and rounded at the points. It is a bold and striking form.—*The Gardening World.*

⁂

New Gladiolus.—*G. Lemoinei Muél Bleue* gives promise of a strain of blue-flowered gladioli. The color is difficult to determine, and may be described as violet-purple externally and much paler internally, with a tint of slaty or lilac blue. The lower three segments have each a large, deep violet blotch on the lower half, with a short median pale yellow band. The tip of the lower segments is a certain shade of blue.—*The Gardening World.*

⁂

Fruit Estimate for 1890.—The average of the fruit crops in western Austria, Germany, Switzerland and France for the year 1890 has been estimated as follows: Apples, medium to poor; pears, good to medium; prunes and plums, medium to poor; apricots, medium; peaches, medium; cherries, good to medium; nuts, good; chestnuts, good; grapes, good to very good.—*Garten-und Blumenzeitung.*

⁂

A New Single Rose.—Mr. Barket, gardener to Lord Penzance, has just presented to the Royal Society of Horticulture, of London, a new variety of single rose, for which he has received a first-class certificate. The new acquisition is a cross between *Rosa canina* and the yellow rose Harison. The flowers are pale salmon, yellow in the center, and are about 2½ inches in diameter.—*Journal des Roses.*

⁂

New Disease of the Potato.—A disease unknown to agriculturists has made its appearance in various parts of France. It is caused by a bacillus which attacks the potato plant near the surface of the ground, causing the cells to turn brown. The plant dies almost immediately. The name *Bacillus caulivorus* has been proposed for the organism causing the disease.—*Le Progres Agricole et Viticole.*

⁂

Masdevallia fulvescens.—This novelty is a very pretty species, apparently allied to *M. infracta*, Lindl., but with more brightly colored flowers. The perianth is of a light half shade, passing into light purple-brown on the constricted sides of the throat, the upper sepal deeper orange-yellow, shading into purple-brown on the two lateral nerves—*R. A. Rolfe, in The Gardeners' Chronicle.*

⁂

Hypericum Moserianum.—This is a very desirable new shrub, said to be intermediate between *H. patulum* and *H. calycinum*, though I fail to see any trace of the latter parentage. The habit is that of *patulum*, but the branches are fewer flowered. The blooms are as large as those of *H. triflorum*, and so far it appears to be quite a hardy kind.—*T. S., in The Garden.*

⁂

A Green-Flowered Chrysanthemum.—The *Moniteur d' Horticulture* gives a colored illustration of a flower, in which the corollas are green. As a curiosity, it ranks with green dahlias, green roses, and numerous other plants.—*The Gardeners' Chronicle.*

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New Disease of Hollyhocks.—A fungous disease, almost identical with one which frequently attacks the potato, is destroying large numbers of hollyhocks in England, seriously threatening their culture.

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Growth of Bamboo.—It is recorded that the shoots of a bamboo in the Peradenya botanic garden, Ceylon, grew at the rate of thirteen inches in twenty-four hours in April.—*The Gardeners' Chronicle.*

⁂

Grape Mildew.—The mildew is severely attacking the grape in the eastern part of France—*Le Progres Agricole et Viticole.*

FIRST FRUITS

*** THE AMERICAN GARDEN *stands for simplicity, good taste, and correctness in names of varieties. In general botanical nomenclature, it follows Bentham and Hooker and Nicholson's Dictionary of Gardening. In the names of fruits, it adopts the catalogue of the American Pomological Society, and in vegetables the Station Horticulturists' revision in Annals of Horticulture. In florists' plants, it follows the determinations of the Nomenclature committee of the Society of American Florists. It opposes trinomial nomenclature, and therefore places a comma or the abbreviation* var. *between the specific and varietal names. It uses capital initials for all specific and varietal Latin names which are derived from proper nouns.*

☞ *This is perhaps the best, as it is the costliest issue of* THE AMERICAN GARDEN *yet published. But the January number will be superior in several respects. Its most important new feature will be a colored frontispiece of new seedling begonias. We may be disappointed, but we are looking for the most natural, and therefore the most beautiful, floral plate seen in many years in any American horticultural journal.*

The series of studies of Japanese fruits is expected to begin in that issue, and the accompanying illustrations are executed with that remarkable fidelity to nature that characterizes Japanese art.

Other features will speak for themselves. Suffice it to say, that we believe no reader of these pages will be disappointed with the magazine in A. D. 1891.

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THE BUILDINGS of the Minnesota Experiment Station were destroyed by fire October 5.

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PITCHER & MANDA, Short Hills, New Jersey, are erecting several new orchid houses.

: : : :

A GARDEN of native plants is proposed by Professor Bastin, of Chicago, for the World's Fair.

: : : :

The Botanical Gazette for October prints an excellent likeness of J. B. Ellis, the well-known American mycologist.

: : : :

E. F. LADD, formerly of the New York (Geneva) Experiment Station, becomes chemist to the North Dakota Station.

: : : :

AN AMERICAN park association is suggested by *Garden and Forest.* Such an association would occupy an open and useful field.

: : : :

F. W. ANDERSON, a botanist known for his work in Montana and elsewhere, has become assistant editor of the *American Agriculturist.*

THE "FIRST flower show and chrysanthemum exhibition," of Williamsport, Penn., was held at Chaapel's Flower Store, November 12 to 15.

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E. WILLIAMS has resigned the secretaryship of the New Jersey Horticultural Society on account of ill health. The society has lost a good secretary.

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SERENO WATSON revives Hooker's genus eriogynia, formerly held as a section of spiræa, and refers three western plants to it as *E. cæspitosa*, *E. pectinata* and *E. uniflora*.

: : : :

THE LUMHOLTZ Mexican exploring expedition has entered upon its labors. C. W. Hartmann, of Sweden, is the botanist. The expedition expects to be out until the fall of 1892.

: : : :

THE SOCIETY OF MINNESOTA FLORISTS held a chrysanthemum exhibition November 12–14, in the New York Life Building, Minneapolis. An attractive premium list was offered.

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OUR CORRESPONDENT, Charles Howard Shinn, of Niles, California, has been made Inspector of California Experiment Stations, to succeed Mr. Klee. This is a worthy promotion.

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THE Bowker Fertilizer Co., Boston, issues an attractive and useful little illustrated pamphlet on window gardening, prepared by Professor S. T. Maynard, of the Massachusetts Agricultural College.

: : : :

JAMES MORTON, manager of Evergreen Flower Lodge, Clarksville, Tennessee, took all the flower premiums at the Piedmont Exposition at Atlanta. His display, both of plants and cut flowers, is said to be one of the best yet made in the country.

: : : :

THE *American Florist* has recently become a weekly. It was formerly semi-monthly. It has been a bright and vigorous journal from the first, and we are glad that it is to make itself twice as useful by coming twice as often. The subscription price remains the same.

BRANDEGEA is a new genus of cucurbitaceæ from the southwest, described by Cogniaux, the present authority upon this perplexing family. The genus is named in honor of T. S. Brandegee, a well-known California botanist. Two species, *B. Bigelovii* and *B. monosperma*, are described.

: : : :

A CARD.—*To the Society of American Florists*—It is with much pleasure that I beg to tender my most sincere and warmest thanks to the members of the S. A. F. whom I had the great pleasure and honor to meet during my recent visit to the United States, for their unvaried kindnesses, courtesies and hearty good will. The Boston Convention astonished me. The floral exhibition was beautiful and far surpassed my expectation.

The conferences were exceedingly well carried out and attended. As regards entertainment and pleasure I think all will agree that we were treated "right royally," as we say on this side. In fact, the convention week will always be regarded by me as one of the brightest periods of my life.

Most noticeable was the prevailing fraternal feeling displayed, each endeavoring to ensure the success of the convention. We should all wish every success to the Boston Gardeners' and Florists' Club, for its generosity and hospitality during our sojourn in its fine city. I was astonished to find America so advanced in horticulture, and I feel certain that with the aid of so many intelligent and eminent horticulturists she will run us a close race.

I regret that I had not more time to enable me to call on other friends, but I hope they will kindly accept my apologies. With pleasing remembrances of your beautiful country, I am

JAS. H. LAING, of JOHN LAING & SONS.
Forest Hill Nurseries, London, England.

: : : :

A GORGEOUS DISPLAY OF CHRYSANTHEMUMS.—We may no longer say with Bryant, "The melancholy days have come," for these are the days of the chrysanthemum shows, and the chrysanthemums of the present day are as much of a specific for melancholy as is the sun-flower for malaria. During the past month, the United States nurseries, of Short Hills, N. J., have been exhibiting the glories of their chrysanthemum house to the members of the press, while during the week of Nov. 10 to 15 inclusive, the general public is invited to feast its eyes upon the modern ten-inch floral wonders evolved from the old "artemisia."

Two noticeable points of this year's exhibition are: First, the almost complete change in the "bill of fare," the varieties prominent last year being scarcely present now; Second, the prominence given to yet unnamed seedlings. Of course, little can be done in the way of description of these for the benefit of people at large until they receive names by which they may be identified.

Some English growers did not hesitate to say last spring that the deluge of new varieties would work ill to this popular flower because there were so very few of them that were in any way superior to the known varieties. The plants which called out these comments were very largely from French growers; whether American chrysanthemum raisers can be doing better than their French compeers, seems always to be a question in the minds of the authorities, especially English authorities, yet the seedlings shown at Short Hills do seem to show that advance is being made. True, many of the new kinds are coarse, and of an ugly form, showing several rows of petals around an open center; yet many of them are extremely fine, being improvements on named varieties which they resemble in beauty of form or color, or in breadth of petal.

Mrs. A. Hardy, the great card a year ago, was this year relegated to one corner. She is a beauty *par excellence*, but a wretched grower. The cut blooms of the pink "Ostrich Plume" so heavily advertised last spring, as shown at Short Hills, bear no comparison with Mrs. Hardy in respect to beauty. The size is good, and the hairy surface quite similar to that pioneer in this style, but the color is a dull, characterless pink which does not please.

A heavy bank at the farther end of the house, was composed almost entirely of Mad. Lacroix and Rohallion. The latter is one of Messrs. Pitcher & Manda's Japanese importations. The color is a fine deep yellow; the long twisted petals are open and flat at the end and the flower is deep. It is a distinct and most beautiful variety, which makes its special corner fairly glow.

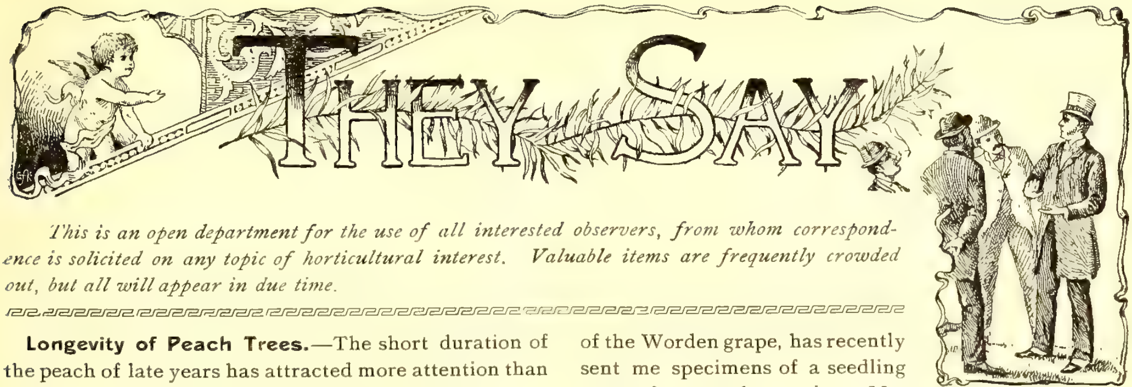
Mrs. Grace Hill is similar to Excellent (which some growers characterized last spring as "the best pink yet introduced for general purposes") but is of finer color, and has greater breadth of petal.

One fine new variety shows a coloring most marvelous—a pinkish gold, very near a pure salmon, and is odd and beautiful, beyond description.

One of the firm's own seedlings, offered last spring at $1 per plant, under the name of Mrs. Hicks Arnold, deserves especial mention. The lower petals of the flower are pink, shading softly to a white center. It is a Japanese, of dwarf growth, and is claimed to be the finest early variety in existence.

Among medium sized varieties, Flora Fewkes (white), Cullingfordii (crimson) and Vieil Or (translated old gold) hold prominent place. No doubt they would give more general satisfaction to amateurs than the show varieties, so many of which are poor growers. Vieil Or, far from being "old gold," as shown here is of the purest golden color, with twisted petals and a fluffy appearance that is very attractive as well as novel in the chrysanthemums.

Last year's western beauty, the "Mrs. Harrison cup" chrysanthemum, Ada Spaulding, was conspicuous by absence, greatly to the disappointment of some of the expectant ones, who expected the cup-winner in great style.—C. S. VALENTINE.



THEY SAY

This is an open department for the use of all interested observers, from whom correspondence is solicited on any topic of horticultural interest. Valuable items are frequently crowded out, but all will appear in due time.

Longevity of Peach Trees.—The short duration of the peach of late years has attracted more attention than the apple. There are many casual observers who jump to the conclusion that the practice of budding is the cause of this, and to those who only look at the outside there is much to support this view. From the window where I write I can look out on a lot of seedling peach trees, whose age I can only guess at, but which cannot be less than twenty-five years. They are pictures of health. Budding is not, *per se*, responsible for the failure, I think, but rather the carelessness of our nurserymen in growing stocks for budding. All over the land there has been an insane sort of impression that peaches must be budded upon stocks raised from southern natural seed. These seeds are collected by country storekeepers in Virginia, North Carolina, Tennessee and elsewhere—and are almost invariably saved from half ripe peaches cut for drying. They are not only half ripe, but from the stunted, starved trees one sees all through this country. The constant use of seed of such poor vitality is largely the cause of the short life of the tree budded on these stocks. The late Col. Edward Wilkins, of Maryland, at one time the largest peach grower in the state, had a theory that much of the trouble of orchardists came from the trees being budded on dissimilar stocks—a late peach on seed from an early one, etc.

He once raised a large orchard in accordance with this idea. He saved seed from the earliest to the latest peaches, and budded them with similar sorts. The seeds were all from budded trees, yet this orchard was one of the longest lived and most successful orchards in the peach district. Many of the trees grew to an enormous size, and when Col. Wilkins built the present mansion at Peach Tree Hall, the newel post of the grand stairway, a very large and ornamental one, was turned from the solid heart-wood of a giant peach tree. This newel post, in its finished state, if I remember right, is nearly one foot in diameter. The members of the American Pomological Society who attended the meeting in Baltimore in 1877, visited this place, and many will doubtless remember the peach-tree stairway. I firmly believe that if our nurserymen would select their seed from healthy trees, without any regard to their being seedlings, the success of budded trees would soon be equal to the seedling ones.—W. F. MASSEY, *North Carolina Experimental Station.*

A New Pear—The Worden (See cut, page 753).—Schuyler Worden, of Oswego, New York, the originator of the Worden grape, has recently sent me specimens of a seedling pear of unusual promise. Mr. Worden writes: "It is a seedling from the Seckel. The tree has fruited five years; is an upright grower; bears its fruit in clusters, and drops from the tree the least of any pear we have. It is a more vigorous grower than the Seckel, and holds its leaves well."

The fruit is broadly bell-shaped, flattened on the apex and obtuse at the lower end; stem short, straight and thick, oblique in a very shallow or nearly obsolete cavity; calyx open, the basin scarcely manifest; color rich yellow with a bright crimson flush upon the exposed side; flesh sweet and melting, slightly musky, very aromatic, high in quality. Its season is last of September and first of October.

John J. Thomas writes me as follows concerning this pear: "I have examined this pear from specimens sent me by Mr. Worden in 1888 and 1889. Last year, in particular, the specimens were very fine. Its great beauty and the greater vigor of the tree seem to give it much value. I think it a remarkable acquisition, and I should be glad if Mr. Worden, who has never been paid for his excellent grape, could make something out of it. I cannot speak confidently of its value without seeing the tree and more of the variety, but am very favorably impressed so far."

Mr. Thomas published an account of it last fall in the *Country Gentleman* under the name of Worden's Seckel. But as the fruit is entirely unlike Seckel, I should prefer to call it simply Worden.—L. H. BAILEY.

Blackberries.—The seasoned opened with the Lucretia dewberry, July 5th. This is a vigorous growing plant, but the fruit has not equalled wild specimens I have often collected in Pennsylvania. On July 12th the Erie and Early King were beginning to ripen. Both these varieties promise well, though this being their first season to fruit on my grounds, I cannot properly judge their fruit.—G. G. GROFF, *Lewisburg, Pa.*

The Apple Scab in Wisconsin.—My trees suffered so much from apple scab in 1882 or 1883 that they did not recover sufficiently to fruit till 1886. It is possible that checking growth may develop fruit buds, but loss of foliage we have always found to be a calamity here, where our severe winters often emphasize the effects of any weakness a tree may possess at the end of the growing season.

I once entertained the idea that wet, cold weather induced the scab, but further observations and experience has led me to conclude that it is in humid, hot weather when the scab runs riot. We had plenty of scab this season, and this winter may kill many of our trees.

After two years experience on twenty-five acres of apple orchard, I have concluded to abandon the use of London purple on account of its injury to the foliage. I suppose I shall use Paris green for an insecticide; and for a fungicide we have tried nothing yet superior to the ammoniacal solution of carbonate of copper, but have hopes of something better to experiment with next season. The ammonia is a solvent of arsenic, and will, therefore, not make a good compound to act as both insecticide and fungicide when used with Paris green.—A. L. HATCH, *Ithaca, Wis.*

American Chestnuts for Market.—Samples of American chestnuts, superior to those of foreign growth both in size and in flavor, have recently been received at the Department of Agriculture, affording a striking illustration of the results of culture and selection. By these means it is believed that the maturity of the chestnut likewise may be materially hastened. Reports received from various sections of the country indicate that the nut may be best prepared for market by being immersed in boiling water for about ten minutes as soon as gathered. Wormy nuts will float on the surface and may be removed; all eggs and larvæ of insects will be destroyed; and the condition of the meat of the nut will be so changed that it will not become flinty by further curing for winter use, and still be in no wise a "boiled chestnut." The nuts may be dried in the sun or in dry-houses after being placed in sacks in such quantities as to admit of their being spread to the thickness of about two inches, the sacks being frequently turned and shaken. Dried by this method they remain quite tender, retain for a long time the qualities that make them desirable in the fall, and may be safely stored; but, of course, will not germinate. A bulletin on nut culture is being prepared by the Division of Pomology, and when published may be obtained by applying to the Secretary of Agriculture, Washington, D. C., or to the Division of Pomology, Department of Agriculture.

Currants and Gooseberries.—In our hands Fay's Prolific currant merits all the praise given it. We had berries as large as early Richmond cherries, and of excellent flavor. We had a full crop of this variety, as also of White Grape and Red Dutch. They all ripened during the raspberry season.

Downing, Houghton, and Smith's gooseberries produced full crops. Downing is the heaviest bearer, but the berries on Smith's were of fine size. Crown Bob and Industry have both fruited. The berries are fine, large, and hairy, and so far are free from mildew. The Industry is now growing vigorously. All ripened during the raspberry season.—G. G. GROFF, *Lewisburg, Penn.*

Peaches in Minnesota.—This year the peach crop of Minnesota has been light, but the peaches have been large and very finely flavored. When the bloom fell in the spring a heavy crop was predicted, but a cold spell came on and caused the bulk of the crop to fall off. Our native plums were even more severely affected than the peaches. In spite of the cold, some peach trees yielded half a bushel of fruit. This shows quite clearly that peach growing here is a success. Look out for Minnesota as a peach-growing state!—PETER M. GIDEON, *Excelsior, Minn.*

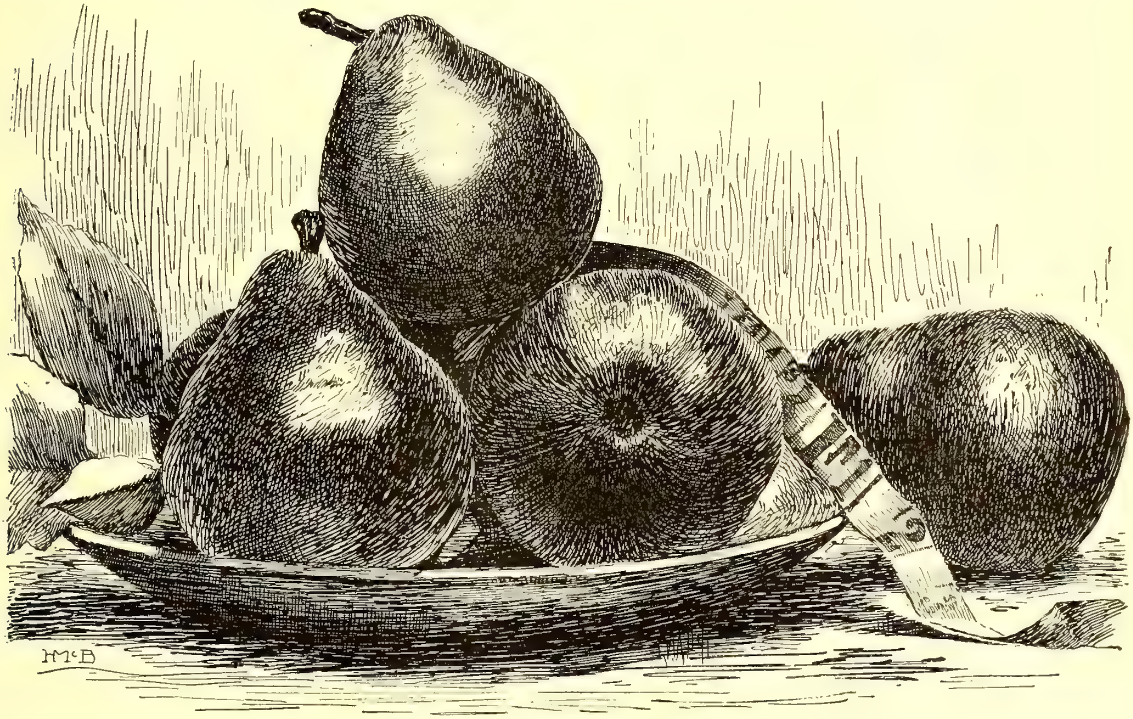
Raspberries.—The raspberry season opened with the Souhegan, June 23rd, two days before the Gandy strawberries were all gone. On my grounds, for family use, and for our local market, I find these four berries, the best I yet know, viz.: for blacks, Souhegan and Gregg, and for reds, Marlboro and Cuthbert. Souhegan is the earliest berry, hardy, a moderate grower; berry medium size, very sweet, with excellent flavor. It is not a heavy bearer. Gregg is about a week later than Souhegan, hardy, a rampant grower; berry firm, seedy, unless dead ripe, excellent flavor when perfectly ripe. The Gregg is a heavy bearer. The season for Souhegan and Gregg berries extended with me this year from June 23rd to July 19th.

I am pleased with Marlboro and Cuthbert for a combination. The Marlboro had just about the same season as the Souhegan, being perhaps one or two days later in ripening. On my grounds it proves to be hardy, a moderate and upright grower, not inclined to branch so much as the Cuthbert, and not given to suckering excessively. It is a heavy bearer. The berries are large, firm, but lacking, this year, in flavor. The Cuthbert (Queen of the Market) is a rampant grower, hardy, prolific; berry firm and of the *best flavor*. The season for Marlboro and Cuthbert extended with me this year, from June 23d to July 23d—that is for family use. We could not gather for market during all this time.

The Hansell ripened no earlier than Marlboro and seems much inferior to it. We discard it. We also reject Shaffer and Centennial. The Brandywine has not proved hardy, and is rejected.—G. G. GROFF, *Lewisburg, Penn.*

Hybridizing the Wild Crab-apple.—It is a conceded point that a man who "never fired a gun," knows but little about military affairs. Now, before turning your correspondent over to the tender mercy of our most noble critic, Mr. R. T. Choke, please to give him another opportunity to show that he has been on the "battle ground" at least, and unless an extremely dull scholar, should know something about *P. coronaria*. Southern Minnesota is said to be the northern limit of the wild crab in the United States, and that it is a much hardier tree here, than the same species found in Missouri, the home of the Soulard. This I have proved by actual test. I have resided in southern Minnesota over thirty years and soon after my arrival I purchased eighty acres of land on which were perhaps over a thousand wild crab trees. Some of these were eight inches or more in diameter, and fifteen feet high. I have never found a sun-scalded wild crab in Minnesota, except the Soulard. We have a tree in open ground, headed five feet high, and leaning to the northeast on an angle of nearly 45°. It is apparently perfect in all its parts. All of our Duchess trees leaning in the same direction, and headed three feet high, are sun-scalded. I firmly believe that the wild crab of Minnesota is the most hardy apple tree known in the United States. With us it has been more free from blight than the Duchess, while the Soulard has suffered most.

The improvement of our native crab-apple was brought before our horticultural societies in Minnesota for the first time last January, and resulted in a prize being offered for the best plate of fruit of this sort by the *Southern Minnesota Fair Association*, and also by the *Winona Fair and Inter-State Exposition*. The crab-apple that won the first prize was of only medium size, perfect in shape, and in color much like the Maiden's Blush.



The Worden Pear. (See p. 751.)

The seeds from the hybrids, as Professor Budd tells us, are very difficult to germinate. Out of twenty-two seeds kindly sent me by C. G. Patten, from his hybrid, only one germinated. Diamonds are not easily found, but very valuable when once secured. This may prove true of the northernmost type of the wild crab-apple, after a few generations of crosses with the hardiest and best of the Russians. There is nothing but theory to indicate that this field is not rich in promise. I have had considerable amusement out of my correspondence with well-known horticulturists on this subject. I corresponded with one of the best horticulturists of Wisconsin on this subject before writing anything for publication. He wrote me very frankly that "The wild crab subject had been taken up more than 40 years ago, and put through for all there was in it!" I stated in reply that it reminded me of a conversation held a short time since with an old farmer who went out to the "Rockies" many years ago to dig for gold; and like many others, the more he dug the poorer he grew. He is now delving away on a poor farm, with not much better results. Knowing his history well, to see what he would say, I asked him why he did not go out to the gold mines and get rich? He remarked that he had "Put the Rockies through more'n 40 years ago for all there was in 'em, and wanted no more Rockies in his'n." Yet it is true that others have taken up the work where he left it, with better plans, better machinery, and better heads on their shoulders, and while they have as yet, "put through" but a very insignificant portion of the Rocky Mountains, they have already brought many millions of treasure to light, and several of them have retired with princely fortunes. May not some intelligent man take up the wild apple of the North and do likewise?—A. W. Sias.

Fruit Inducements in Oregon.—Each year sees a steadily increasing consumption; and as many of the foreign fruit producing centers have reached their utmost capacity of production, it is left for these newer sections, among which the Pacific coast—and especially the favored northwest valleys—is foremost, to furnish the increased amount required. There is no danger of overdoing this matter. Only about one man in every ten that has any inclination towards fruit culture will make a success of it—simply because it requires more skill, tact and forethought than they are willing to give—so that to the earnest, industrious man who can "stick" through the first five years while the orchard is starting, give it good culture and not starve it by taking off other crops, it offers an exceptionally bright opening.—*Professor E. R. Lake, in Corvallis (Oregon) Gazette.*

Hardiness of Seedling Peaches.—It is a mistake to suppose that all seedlings are hardy. I have over 1,000 seedling peach trees on my place and among them you will find as many tender ones as hardy ones.—*E. Hollister, before Alton-Southern Illinois Horticultural Society*

How Many Varieties of Cranberries?—I should like to know how many varieties of the common cranberry are known under specific names. A. D. Makepeace, of Massachusetts, writes me that the "varieties of the cranberry can scarcely be numbered. I know of as many as a hundred, and presume that there are others who know of as many more."—L. H. Bailey.

Strawberries.—I fruited Sharpless, Cumberland Crescent, Kentucky, Glendale, Manchester, Gandy and Monmouth. The fruit was ready for the table June 6th and the season closed with us June 25th. The earliest berry was the Crescent and the latest the Gandy. Each variety produced only about half a crop, and this in a favorable season, for we had plenty of rain at the right times, and my plants came through the winter in good condition under a light covering of long stable manure. By far the finest berries I produced came from the Gandy plants, which were also much the most thrifty and vigorous growing vines on my grounds. Monmouth, growing right beside the Gandy plants, did no good at all, and most of the plants died. I am not prepared to give the explanation for this. The Gandy is the finest shaped and the firmest strawberry I have ever grown.—G. G. Groff, *Lewisburg, Penn.*

Celery Plants.—In Mr. Greiner's celery article last month (p. 669) it was stated that the plants in the seed-bed should be 50 to the rod, while 50 to the foot was meant. But Mr. Greiner writes us that 25 to the foot would probably be better in most cases.

The Ignotum Tomato.—The seeds of the Ignotum tomato germinated finely and in 100 days from planting of seed I had excellent ripe tomatoes, fit for eating uncooked. The time would have been lessened a few days but unfortunately several of the most vigorous plants, already set with fruit, were cut off by the gophers.

The fruit is large, and fine in form, with firm flesh. The women of the household think it the most pleasant flavored of any tomato they have ever used. The growth of vine is strong and vigorous, and so far perfectly healthy. The fruit, however, decays quickly when permitted to rest upon the ground, and on this account I fear the Ignotum will not be so well adapted to winter growth here as I had hoped, unless trained upon posts or over brush, for both vines and fruit should be kept from the ground.—H. J. Rudisill, *Los Angeles, California.*

Cory Corn.—I have tried for three years to grow Cory Corn in the state of Nebraska. I obtained seed first of J. J. H. Gregory, Marblehead, Mass., and planted two acres. It was a failure—no marketable ears. The corn would not fill out, and was terribly smutty. I thought it wanted acclimatization, and so I saved the best of it and tried it the next year. The result was worse than before; I obtained nothing fit for the table. I began to think I had been imposed upon in the purchase of the seed, and this year to give the thing another trial, I bought of another seedsman, James Vick, and planted the corn in our excellent soil in the best manner; I fully expected to beat my neighbors, who did not plant Cory. It was carefully cultivated and now the result a total failure, worse than before! There was not one perfect ear in the whole quarter-acre plot. We failed to get one mess for our own table even of half-filled ears of corn! The small cob was there—sometimes—and a few grains of corn, but nothing half-way perfect. I am disgusted with Cory, and will never plant it again in the west, unless I have a "change of heart," or see some good reason for so doing. I will take Stowell's Evergreen, or some other variety tried in this section hereafter. This item may save western planters some dollars, and not a few.—O. L. Barber, *Beatrice, Neb.*

Lettuce in Hotbeds is not a difficult crop to raise by the following method: January 1st sow half an ounce of seed under one 3x6 sash, putting hot horse manure under it. Protect this sash through cold and snow with mats and shutters, till the plant has four leaves. Then prepare two or more frames to receive the plants. Plants should be taken into a warm place and potted in two-inch pots, one plant in a pot; 450 pots will then go under one sash. Put two inches of dirt on the manure, and set the pots on it, within three inches of the glass, and at the end of three weeks, or the first week in February, the potted plants will be ready for a final setting in the bed where they are to head. For four or five weeks the plants that will occupy 20 sashes have been growing in three, over heating manure twice applied; whereas, if the plants had been set in the large bed when first planted, the heat would have been nearly spent. Now the half-grown plants with a nice ball of roots can be set in the fresh earth, over freshly heating manure and they will mature in 90 days from the time of sowing the seed. The extra labor of potting is balanced by the small amount of glass to be cared for till the plants are half grown. This plan seems much better than others that have been practiced.

In making the beds to receive the potted plants, throw the manure in without treading, within eight inches of the glass; then put on six inches of earth. This will bring the lettuce within two inches of the glass. Fifty plants will go under a 3x6 sash; and as the manure settles and the plants grow, the distance of the lettuce from the glass remains about the same. The heads on the outer edges of the beds thus have an equal chance with the central ones. The danger from frost early in the season, and from scorching later in the spring is greater, and the sashes will require more care to prevent injury.

Dandelion roots set in the bench now will be ready for market or use in about four weeks. The round radish grows well also in a close house, but the long ones do not succeed well; they want more air and deeper and finer soil than the round ones.

New Carnation.—A new carnation has been originated on the grounds of Peter Henderson & Co. It is called American Flag carnation, and promises to be quite valuable. It is moderate in size, handsomely and quite regularly striped with crimson on a white background. The foliage shows that it is descended from the most hardy roots.

The manner of growth is about the same as that of the pink, for the clusters are rather short-jointed and four or five blossoms are borne upon a single main stem. The variety is a sport from Portia, itself a fine scarlet. The striped sort will probably attain considerable prominence.

Lilies and Roses.—Referring to planting of lilies, the germs are not so hardy as one might suppose from the catalogues. They do better with some protection from frost, and it pays to take the trouble. Every garden should be full of roses. Fortunate people who live where the winters are mild can have grand roses, but in this severe climate the question of hardy roses is a matter of experiment. The Austrian roses are hardy here, but the fine hybrid perpetuals, etc., have to be thoroughly protected; yet in severe climates, sufficient protection will often smother the plants.—P. F. BLODGETT, *Vermont.*

Prairie Soil and Moisture.—I notice the item under this head on page 241, April No. of AMERICAN GARDEN. It presents something new—new to me, and I want more upon that subject. Our prairie soil is rich, but the facts are as stated, and there must be some good reason why larger crops are not brought to the harvest. Is the hygroscopic capacity of our soil at fault? Who has the facts? The theory is beautiful, and may be as true as beautiful. (?) And if so, what are we going to do about it? Where is the remedy?—O. L. BARLER, *Beatrice, Neb.*

Variations of Prunus Padus. — The bird cherry as found in eastern nurseries, introduced from west Europe, has not proved hardy in central Iowa, and I know of no good specimens north of the 40th parallel in the prairie states. Finding varied forms of the tree in Poland, North Silesia, and in all the Russian provinces east to the Volga in the summer of 1882, I decided to introduce a number of typical forms for trial. These have proved entirely hardy up to the 44th parallel, and some of them, I believe, are handsomer in foliage, habit and bloom, than the common varieties of west Europe. In central Russia the common form is known as *Prunus Padus, macrocarpa.* It is a rapid upright grower with dark green foliage and long racemes of pure white flowers that open in the season of the Persian lilac. This will prove hardy, I think, up to the 45th parallel in the prairie states, and will be liable to sun-scald of stem if trimmed up when planted south of the 40th parallel.

As we reach the provinces west of the Volga we find the most common form to be upright in habit when young, but as the tree attains size the branches become pendent. In early spring they are among the most beautiful trees on our grounds, as the pendent branches show off the pure white blossoms to better advantage than the varieties with upright habit. We were informed by Dr. Maximowicz that in central Asia, and in the valley of the Amur, the common form is known as *Prunus Maacki.* Beyond all doubt this is merely a variety of the bird cherry, but the tree is more spreading in habit, is denser in foliage, and it flowers more than two weeks earlier than the varieties noted above. It also—as stated elsewhere—is inclined to start its buds prematurely in winter, while the macrocarpa and pendent variety of the Volga hibernate as perfectly as the currant or Duchess apple. I was called to task for stating that the cultivated cherry was worked on *Prunus Padus* on the Volga. Yet, I believe it to be true, and at this time our grafts upon it appear to be doing well. —J. L. BUDD.

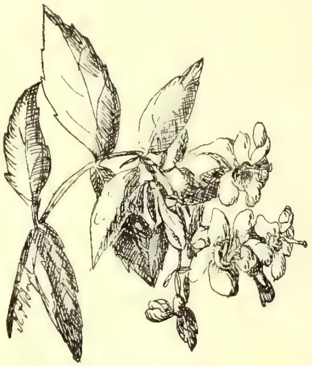
Zinnias are among the most showy of summer annuals and deserve the careful attention of every lover of flowers. They are natives of Mexico, but are now cultivated in nearly every clime, although they belong to the half hardy class of annuals. The beautiful double specimens, of various shades of color, which are seen in the gardens during summer are varieties of *Zinnia elegans* which in its natural state is single and of a scarlet color.

Zinnias are among the easiest plants to grow. They will bear some neglect, and will stand a long period of dry weather without injury. During periods of stormy weather they make rapid growth but are liable to be blown over or broken off by the winds. The improved varieties are very beautiful and should find a place everywhere, as they are most valuable for cut-flowers. If the blossoms are removed as soon as they begin to fade, and the plants are not allowed to perfect seed, they will continue to grow and to produce an abundance of flowers until frost comes. The seed should be sown in a hot-bed about the end of March, and as soon as the young plants are large enough to handle they should be pricked out, and when they begin to grow again care should be taken that they do not become drawn. This can be prevented by allowing the plants plenty of air during seasonable weather. About the first or second week of June, according to latitude, the plants may be set out where they are intended to flower, setting them at least two feet apart. A neat stake should be placed beside each one for the purpose of securing the leading shoot. The zinnia delights in a light rich soil. In this latitude the seed may be sown out-doors during the first week of March, but a garden light or canvas frame will be required to protect the bed from heavy rains until the plants come up.

Zinnias may be disposed of in the garden in a varieties of ways. A long row, if backed up with suitable plants, has a very striking effect. Or they may be used to fill beds by themselves and in this case they should be pegged down so as to cover the whole surface of the bed and to replace any gaps that may occur through the death of any of the plants. The zinnia is a sun-loving flower and refuses to thrive when shaded by trees or other large plants. The plants should be carefully hoed until they become too large.—H. W. Smith, *Baton Rouge, La.*

Helianthus multiflorus.—Seeing what Mrs. Mary M —— says in the September number of The American Garden, viz., that *Helianthus multiflorus* needs no protection, reminds me that all climates are not alike any more than all people, and if some one in Minnesota should conclude to leave this plant without a good covering during the winter they would find themselves without the little yellow sunflower the next season—I speak from experience. It needs fully six inches of some sort of covering, leaves, or litter from the stable; for we are never sure of deep snows to protect plants, but always sure of cold weather. I find that the white day lily does much better if kept in a tub of rich soil without changing the earth for several years. I set the tub in the cellar during winter and bring it up early in spring, and in that way I get all the bloom there is in the plant before frost. If it is left in the ground the plant will live through our winters but will only begin to bloom in the fall about the time we have our first frost.—Miriam Parker, *Minnesota.*

Some Bedding Plants.—One of our prettiest bedding plants is the double white petunia; for an oval bed four feet in length, five well-rooted petunias will be sufficient. Have them well scattered over the bed, so that the ground may be evenly covered. As fast as the plants grow, peg them down to the soil with common wire hair-pins, for they are not so easily displaced by storms. Nip off the points of all branches, thus causing them to spread out more. In a very short time the bed will be covered and a constant succession of white flowers will appear until autumn. Another most desirable plant is the thunbergia, for although it is a vine, it is admirable for bedding purposes, especially *Thunbergia aurantiaca.* It is best to procure the plants, though the seed will come on rapidly if the soil is in good condition, warm and mellow. The stems should be pegged down at the joints. Lay them over the bed as evenly as possible, and the latter will soon be a mass of bloom. The dark green of the foliage and the clear, orange blossoms with dark eyes form a beautiful and striking contrast.—Mrs. A. D. Brown, *Bellevue, Penn.*



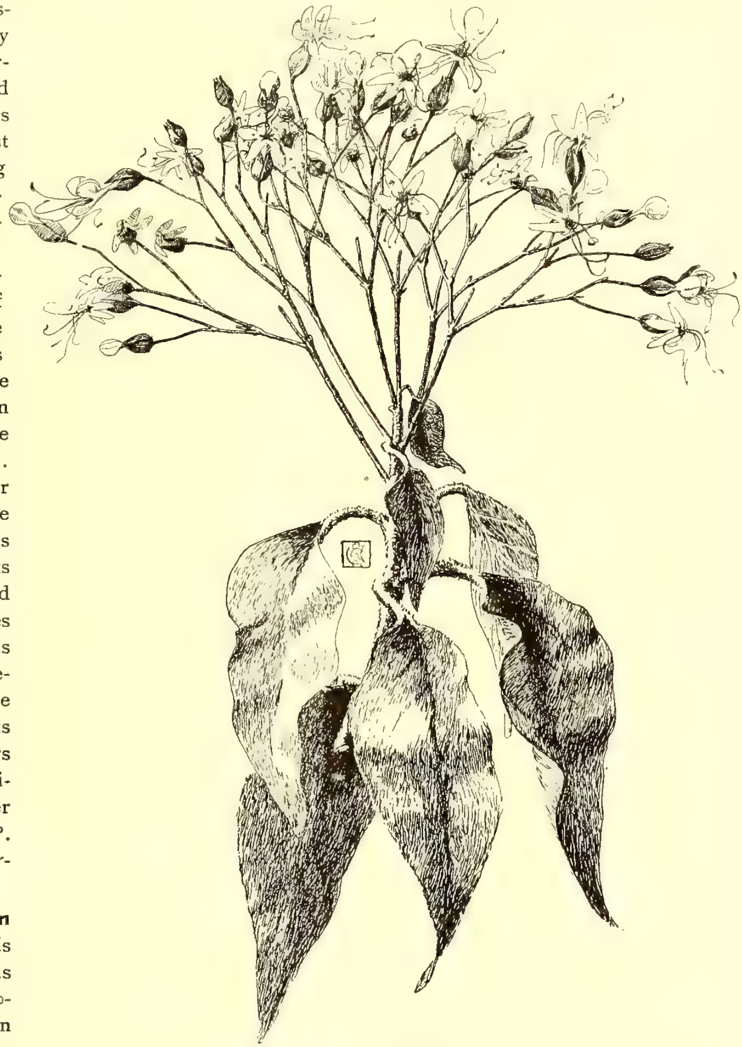
Eugenia Myrtifolia.

Eugenia Myrtifolia, a very beautiful low shrub with evergreen myrtle-like leaves and fragrant, white, funnel-formed flowers, has been in bloom for the past two months in my garden. The pale green and reddish sepals or bracts are ornamental after the corolla falls off, the branchlets drooping gracefully. I never saw this plant cultivated in the eastern states; I suppose it would not stand heavy frosts, and I think this number of The American Garden gives the first drawing of it. It is a dainty plant, probably from Japan.—K. P. S. Boyd, *San Francisco.*

Notes from Minnesota. — Put your moonflower vines in the sunniest place you have and give them very rich soil if you want them to get ready to bloom before frost comes. I saw this in some floral magazine—"Plant the moonflower where it will not get so much sun"—that was not meant for Minnesota. Our season for growing plants is short, to be sure, but how they do grow while they are at it! and by doing our best with them we can have very lovely flower gardens, and a great variety of flowers. I have in my yard large oleanders, cactus, achania, pomegranate, enonymus, jessamine and passion vine, all growing in tubs. These are consigned to the cellar during winter and they bloom finely during summer—no, the jessamine and passion vine do not bloom freely, but they grow like Jack's bean stalk! The others except euonymus, which is grown for its foliage, bloom finely. I am going to add magnolia and other southern shrubs to my "tub collection," for I can, with a frost-proof cellar and some sunny windows, grow anything, even in Minnesota. At this writing, October 6th, frost has cut down dahlias, but marigolds of different sorts, petunias, and even *Salvia splendens* are making the garden bright, while vines (partially protected by porches), morning glories, the different ipomeas, etc., are still blooming. Abutilons that were planted out last spring have grown to be immense shrubs. They are still in the ground, uninjured by frost, and are full of buds and blossoms. —Miriam Parker, *Minnesota.*

The Herbaceous Perennials of Nurserymen.—Noting the increasing interest in perennials for the flower garden, I think it is well to call attention to the miserably small, weak plants that the nurserymen send out under the head of perennials. I have experimented with a good many kinds, purchased from various houses, and like a great many amateurs, dislike to be obliged to buy a dozen plants in order that out of the lot two or three may flower. New perennials are of slow growth and the weaklings that are sent out by most houses, little slips or seedlings forced under glass, are enough to discourage ordinary people. Good perennial roots should have one summer's growth and a rest during the following winter before anything should be expected of them.

If the nurserymen are desirous of working up the trade in herbaceous perennials they are spoiling their own interests by the course they take. There are one or two houses that are exceptions to this rule; their plants are what they should be and their prices are what the plants are worth, consequently they are high, and their lists might scare buyers who have not experimented with lower priced houses.—P. F. Blodgett, *Vermont.*



Clerodendron serotinum.

Clerodendron serotinum.— This hardy deciduous shrub was introduced from Japan about twenty years ago under name of *Volkameria Japonica*, but in more recent classifications is called *Clerodendron serotinum.* It forms a large spreading bush 10 feet high, clothed with a rich mass of broad acuminate leaves, which emit a slightly fœtid odor when crushed or when wet with dew in evenings. The young wood, petioles and under surface of leaves are thickly covered with a soft velvety pubescense. The plant blooms profusely in the eighth and ninth months, each branch of young growth bearing a large terminal panicle of pretty flowers that are pleasantly fragrant with a mild daphne or verbena odor. The angular sack-like calyx is of a rosy or purple shade and the protruding corolla and long slender stamens and pistil are white, with the anthers dark brown or slate color. The plant grows freely in rich land and is readily propagated from suckers; also from hard wood cuttings and root cuttings. In fact, the tendency to sucker freely when its roots are disturbed would be an objection to its introduction into some situations, while this habit makes it the more valuable for a cover plant on hillsides and waste corners. There is, however, no difficulty in keeping it in subjection or eradicating it when desired. Its scarcity in this country is entirely owing to the neglect of nurserymen, as it is a fine showy plant which will help to supply the demand for good autumn bloomers and adds a pleasing variety to our limited list of hardy shrubs that bloom at this time of year. — Samuel C. Moon, *Morrisville, Bucks Co., Pa.*

The Snowdrop.—The snowdrop is the most welcomed of the early spring flowers, and we look cheerfully forward to the time when we shall gather our first blossom. After a hunt amidst leaves and snow we find it bravely peeping up and bearing unflinchingly all the vicissitudes of the early spring season; how we eagerly secure our prize and bear it off in triumph, inwardly rejoicing that winter and spring have met, and that we may now expect warmer suns and brighter skies!

Those who would have snowdrops in the spring must plant them now. There are several species in cultivation and all are desirable; there is also a beautiful double variety. Closely allied to the snowdrops are the snowflakes, or leucojums. The snowdrop delights in a rather strong loam, in a position where it is seldom disturbed. It will thrive freely under trees and shrubs and in the grass on a sheltered lawn, and it does well when planted on a grassy bank. When planted in the border the bulbs are often much disturbed and sometimes seriously injured by the hoeing and raking necessary to keep the beds in order; and besides the flowers are often greatly disfigured by being dashed about by the heavy rains and winds that are so prevalent in the spring time.

For planting the bulbs in a lawn a spade or garden trowel may be used. Insert the spade about three inches into the turf and cut a triangular piece of sod out. Remove the sod and plant the bulbs thickly; then replace the sod and flatten it down carefully with the back of the spade. Some use a dibble and fill up the hole with garden soil. I object to the dibble because it makes pointed holes and so hardens the ground that it holds water for some considerable time, and the bulb is apt to lodge an inch or so from the bottom of the hole, where it is placed in the best possible position for decay.

The snowdrop is difficult to force, but it can be made to produce its flowers earlier by covering the plants with a garden frame. When it is necessary to force them in the greenhouse it will be found best to plant them rather thickly in shallow pans, and to subject them to a temperature that shall at no time exceed 50°. Water them occasionally with very cold water. To grow them for the sitting-room they may be planted thickly in pots or pans and then placed in a sheltered situation. Bring them into the house when the buds begin to show. If subjected to any degree of heat they produce nothing but leaves.—H. W. SMITH, *Baton Rouge, La.*

Lagerstrœmia Indica is a very beautiful half hardy deciduous shrub belonging to the natural order lythrarieæ. It attains a height of 10 or 12 feet, and has numerous branches. The leaves are opposite, entire, roundish ovate, and glossy green in color. The flowers are produced in large, leafy panicles at the extremities of the branches during the months of September and October, the individual flowers being large and of a rich rose color.

The plant is a native of the Indies, where it was discovered by Dr. Wallich, who introduced it into England in 1841. It is one of the prettiest as well as one of the most rare species of this splendid genus, and as it is a plant easily cultivated I do not think that too much can be said in its praise.

The easiest and best method of cultivating this plant is to set it out in a well-enriched, deep border in a sunny situation. I plant it about the 10th of May and keep it well supplied with water during the summer months; and if all goes well it will commence to flower in September, and continue to do so until destroyed by frost. Then it should be taken up carefully, potted, and placed in any situation where it can be given a uniform winter temperature of 40 degrees. Before the plants are brought inside they should be trimmed and all superfluous wood removed. Water must be very sparingly given, the object being to keep the plant in a dormant state until the ensuing May, when it can be planted out and started into growth.

Propagation is effected by cuttings of the half-ripened wood, and if the young plants are repotted as often as necessary and carefully cared for, nice flowering specimens will soon be obtained.

The lagerstrœmia is often grown as a pot plant, and in order to ensure success, it is absolutely necessary to give it an abundance of room for its roots, and good drainage. It should be grown in a compost composed of two-thirds well decayed sods and one-third well decayed manure; mix thoroughly, and during the season of growth apply liquid manure with a generous hand.

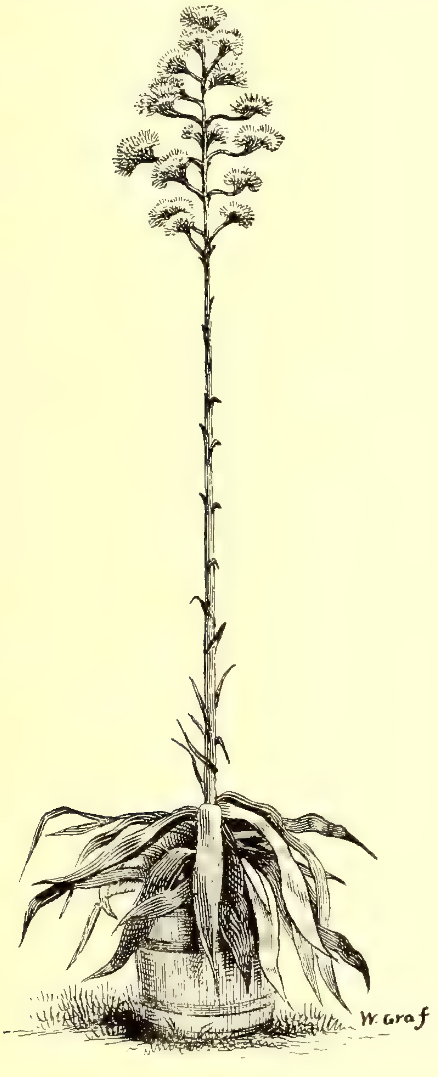
The plant should be taken out of the pot or tub every spring before it starts into growth. Carefully remove all the soil from the roots, and then repot, using fresh compost, and treat as previously advised. During our hot dry summer weather the plants occasionally become infested with red spider, and then they should be thoroughly syringed every evening until these pests are destroyed.—CHAS. E. PARNELL, *Queens, N. Y.*

The Winter Aconite.—The botanical name of this pretty little plant is *Eranthus hyemalis*. The generic name is very appropriate and signifies spring flower. This is about the first plant to unfold its flowers in the spring. The blossoms are yellow and are surrounded with a whorl of bright green, finely divided leaves. It generally continues to produce its flowers for about two months. The ordinary leaves of the plant appear after it has flowered. The plant thrives well under the shade of trees and upon shady banks and in these situations it is very effective, and is very pleasing when seen under the waving boughs of an evergreen shrub. The soil should be made moderately rich before planting, as the roots may be allowed to remain an unlimited time before being removed. The roots are of a brown color, very uneven in form, and are really underground stems. They should be planted about an inch and a half deep and about two inches apart. A dibble or garden trowel may be used in planting. The plants can be raised from seed, which should be sown as soon as ripe. It is hardy as far north as in Ontario.—H. W. SMITH, *Baton Rouge, La.*

Out-Door Roses.—I have prepared with great care a bed for 60 tea roses to be planted out next spring, and am anxious to get the best dozen varieties for out-of-door culture. So far I am inclined to make the list as follows—but would be very thankful if anyone will improve it or point out any weakness in it. I want to include Perle and Mermet, but they are not satisfactory with me, and so they are discarded—in this dozen I want only those upon which I can depend for good results in my location.

Marie Van Houtte, Safrano, Papa Gontier, Sombrieul, Mad. Hoste, Coquette de Lyon, Pumila, Malmaison, Sunset, Viscountesse Folkestone, Princess Sagan, Marie Guillot or Isabella Sprunt.—R. A. M.

Answer by B. M. Watson, Jr., Bussey Institution.—The list of roses seems a very proper one for trial in out-door bedding, by no means an easy undertaking; so many circumstances of soil and situation are to be considered that any list must be largely experimental.



AGAVE AMERICANA.

I should advise as additions, or substitutions if they make the list too cumbersome, Bon Silene, Devoniensis, Climbing Devoniensis, Glorie de Dijon, Mad. Falcot and Souvenir d'un Ami for teas proper, all strong growers and likely to be more hardy than one or two on the list. The best roses, however, for this purpose are, in my opinion, to be found among the so-called daily roses. I would advise as the best of these, Hermosa, Queen of Bedders, and Souvenir de la Malmaison, Bourbons; Agrippina, Cels, Louis Philippe, Mad. Bosanquet, Nemesis, Cramoisi Superieure, Eugene Beanharnais, Bengals; and the Noisette Fellemberg. These are old roses, and to be sure there is not the variety in color which is to be found among the teas, but they are more hardy and good growers, besides being great and constant bloomers; they are not roses fit for the market, except Souvenir de la Malmaison, but for house decoration they are charming. If they pass through the winter in good condition you obtain a fair bloom in the spring, but the great flowering comes in autumn, continuing until severe frost; we are gathering them now here, and a large bush of which I know has given continuous bloom since August 1st.

The Century Plant (*Agave Americana*).—There are very few people that have had the good fortune to see the large century plant in bloom. For although it does not take a hundred years to mature, as its name would lead one to think, still the flowers are very rare, not only from the reason that it takes a long time before they are produced, but also because the plant becomes so large that very few persons are able to take care of it, as it must be brought in-doors in winter.

The one here represented was exhibited about 20 years ago on a private estate in Germantown, Pa. The owner, Mr. Carpenter, kindly threw his grounds open to the public. The plant, as near as I could estimate, was at least 20 feet high. It grew in a tub about 3 feet in diameter and 2 feet 6 inches high. The shaft at its point of emergence from among the immense leaves was 4 inches in diameter, and tapered gracefully to the summit where it was surmounted by a cone-shaped cluster of canary yellow flowers. This cluster was fully five feet high and three feet in diameter. It was very graceful and symmetrical, and constantly surrounded by innumerable bees. The plant attracted a great many visitors. Indeed it is such a rare thing to see one in bloom, that a few years ago, when one was exhibited on Chestnut street, in Philadelphia, the owners charged 25 cents admission, and throngs went to see it.—WILLIAM GRAF, *Philadelphia, Penn.*

Odds and Ends.—"What will grow and look nicely in my window this winter?" is a question often asked in early fall. A quiet search in the garden beds, even if there has been a light frost, often brings treasures to view. Here in the petunia bed, under the old plants, are late seedlings several inches high. These, potted, will grow and bloom all winter. Sweet alyssum, too, may be treated in the same way. Be sure to get a clump from the musk bed if you want someting to scent the whole room.

Perhaps your geranium bed is now full of large plants, and you wonder what can be done with them. Last fall I cut off a half bushel of slips and carried them to a florist. He was very glad to get them, for he said his stock geraniums always run low towards spring, and he gave me in exchange several choice plants for my window garden. Next fall I shall cut off slips from coleus or anything else that is a flourishing plant, and take them to the florist's. I may get some plant in exchange that will gladden my eyes all winter, and that is better than letting Jack Frost destroy them. After the geraniums are cut down, I pull them up and store them in the cellar, packing them in a large clothes basket with earth around the roots. In February I plant them in pots, and put them in a sunny cellar or garret window, where they soon come out again and are thrifty plants.—SISTER GRACIOUS.

Signs for Choosing.—My neighbor, a business man, asked me to name a man to do small jobs for him abou the house throughout the winter. He wanted some one he could rely on, and as the pay was sure and liberal, I was interested in getting a good man for the place. I knew of two jobbers and we went to see them. They lived side by side in frame cottages with small yards in front. In the first one the weeds were as high as the fence; not a blade of grass or flower could be seen; the windows were broken, and the steps were rickety. Even the cat looked forlorn and miserable. "I do not want the man that lives in that house," said my friend. In the next house the path was clean to the front door. The four o'clocks, balsams and asters made the little yard bright; the steps were firm and newly painted; while a fat, comfortable looking baby peered at us through the gate. "This is the man for me," said my neighbor, and he hired him on the spot, and both were benefitted by the bargain. Said a book agent, "I am apt to get a customer where I see flowers in the window, and, at least, they don't shut the door in my face." A young man chose his wife from seeing her carefully weed and water her garden day after day, and after ten years of married life, he said of her, "She is a good one."—SISTER GRACIOUS.

Gardening for Women.—Gardening is one of the things women can do, and do well. Men may have the strength, but when it comes to that, women gain it, too, by the out-door exercise; and their skill is greater, while their patience, under the difficulties sometimes incident to the work, is remarkable. It takes experience and it takes intelligence to make a success of the business, and women have the latter and can acquire the former by thoroughly mastering every detail of horticulture, or the more commonplace methods of vegetable culture. It has been truly said that no lazy or light-minded woman will ever be tempted to undertake gardening if she knows it. But no work is sweeter or pays better—not in money so much as in health, good spirits and contentment.

Women have wrought wonders in the culture of rare flowers, and in spending many hours of each day in the loving care and attention required at their hands by these beautiful products of nature, they are well repaid by the exquisite flowers produced, while the time thus spent in wholesome exercise in pure air and healthy sunshine does more in adding years to their lives than the learned care of the best family physician.

It is wonderful what a vast field of knowledge opens out to the woman who studies the nature of the loveliest flowers she can grow, and takes an interest in the culture of the fruit upon the home-lot, and even spends some time in finding out and raising, too, the most profitable and best kinds of vegetables for the home table.

She need not lose her interest in the in-door matters, but the garden will soon come to be a source of exquisits pleasure which is not to be foregone for any of the usual temptations in shape of a new novel or the latest in fancy work, over which so many of our American women dawdle. I don't think that the daintiest woman will care that her hands are growing larger, or browner, when the red of wholesome health is creeping over the rounded cheeks that had lost their color for so long. And then the flowers that adorn not only the garden, but fill the house with their fragrance, are a fairer showing for their labor.

Women have been most successful in fruit culture, especially in that of the grape. They not only plant, but prune them, with the skill that only experience brings. They have also, many of them, become quite skilled in budding and grafting, and the knowledge thus attained has been the source of no small gain in many cases. It enables many a woman to surround her home with some of the choicest fruits and flowers that would otherwise be out of her reach. How many have waited and wished for the slip of a rare new rose, or having it, knew too little to "make it grow." There is no "luck" in another's knowledge just how to do it. Their success is due to the knowledge which time and experience have brought.

Homes can be made so much brighter and better by the wholesome contact with flowers. The children of the family, too, will grow up loving them, and if the mother is wise, she will instil in them her own love for the beautiful things of nature. Teach them to plant the seeds and set the plants, and see their delight over the flowers they call their own. I think, as the years go on, that there is an increase in the number of women who are engaged in either flower or fruit culture, or in the equally interesting matter of raising the very best kinds of vegetables for market or table. It is looked upon no longer as mere manual labor and unfit for the fair hands of delicate women, but as a beautiful and invigorating means of gaining a renewed lease of life, as well as being a source of pleasure and profit at the same time. It has come, too, to be an education, as we study the life of flower, of plant, and of tree, and understandingly minister to each.

A lady says; "If I were to pick out days of my life that have been most peculiarly worth living, they would be those when I wrought among roses and raspberries from dawn to sunset without stopping, save for meals. Over these I can write 'Abiding satisfaction.'"—H. K., *Germantown, Ohio.*

Some Needs of Gardening.—As trucking means trafficking, we deem truck-farming an improper term, and prefer to include in the class "market-gardeners" all that portion of the cultivators of the soil to whom the above term is now, in some sections, applied.

In the olden time, it was said:

"Who by the plow would thrive,
Must either hold or drive."

But now,

"Who by the plow would thrive,
Must both well hold and drive."

Our first need, then, is a light steel plow. In the times of large stumps and costly steel, the heavy cast iron plows may have been a necessity, but now, with our land free from solid obstructions and with cheap steel, we should have a light sharp plow with which one man and one horse can do as much, and do it better, than two formerly did. It may be said light steel plows will cost more and not last so long, but as men and horses are more costly than plows, and not so easily replaced, it is true economy to adopt the plan by which the former will last the longer.

The recent disk cutaway harrows and pulverizers are great improvements on the old drags. The best we have yet tried is the Lubin pulverizer. It leaves the soil in fine condition for seed planting without any further treatment.

Among the many drills there should be some that are reliable, but we hear much complaint. In cultivators, we have some which do well. As we have more fear of waste by leaching than by the evaporation of fertilizers, we apply them on the surface after plowing and during the growth of the crops, and for mixing them with the ground, the pulverizer referred to excels. It will work coarse manure in without clogging, as harrows and cultivators mostly do. For clearing the rows of weeds, we prefer the rake to the hoe, but can find nothing on the market to suit. The teeth are too short and do not hang at the proper angle. We made some with hardwood heads and steel wire teeth four and one-half inches long and one inch apart. We place the heads on the handles so that the teeth stand at right angles to the surface when the back-bone is nearly perpendicular. This enables us to both push and pull the teeth through the soil. We can pulverize the soil better, and work closer and deeper about the roots than with a hoe. For working radishes and plants three inches apart, we use a three-toothed rake, which is two inches in width, and we find it best even for rows six inches apart. The length and closeness of the teeth enables us to pull out weeds by the roots. Such rakes might be made entirely of steel, and they would work a little better, as there would be no projecting ends; but so far we have not succeeded in inducing any manufacturer to make them.—R. BRIGHAM, *N. J.*

[A "handy" blacksmith could fashion the rake referred to at a moderate expense. But in these days of machine work for the smith shop, a really handy country metal worker is scarce!]

Front Lawns and Fences.—The many "no fence" articles in THE AMERICAN GARDEN suggested to me to try the experiment of planting flower seeds and setting out plants in front of the house. We are near the outer edge of the city, cows feed in front of the house, and pass it every day, and plenty of rude boys and girls in the neighborhood would steal the apples off the trees before our very eyes. We made a narrow bed on three sides of the house, and planted zinnias, poppies and marigolds, and also set out some geraniums and other plants. To our surprise, very few were stolen. The boys tending the cows seemed to take especial pains to keep the cows off the grass plat, and even the smallest children did not touch them, the flowers appealing to their better nature. And in order to take care of itself and bloom right along, the verbena should have a large bed inside the grass plat. It would be a pleasant change from the inevitable scarlet geraniums. If the bed is slightly protected in the fall, the self-sown seeds come up the next season, and soon make blooming plants.—SISTER GRACIOUS.

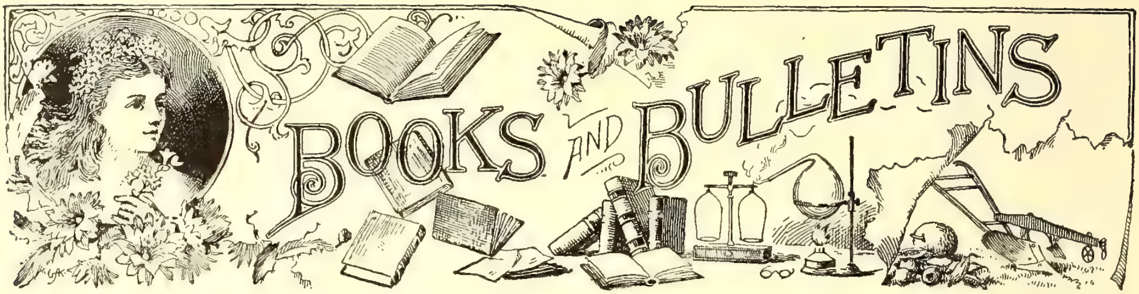
Handy Things.—My garden is near two tall electric towers which cast light within the fence. I often weed and water after tea by this brilliant light, and can work much more comfortably than in the sunlight. Another handy thing is fifty feet of hose; this fastened to a penstock gives me a grand shower. One of my garden comforts is a light, strong wagon than can be pulled about among the garden beds. It is loaded with weeds or flower pots, and putting in baskets or a light spade, we pull it into the woods and fields when we go for nice soil. Another handy thing is a slip bed. It is close to the house and is watered every day. It receives bits from bouquets or pieces pulled off here and there, especially from geraniums when in bloom. Another of my handy things is a large tin pail with a spout that will hold the manure tea and send it down to the roots. I also have a rough potting table close to the fence, and several baskets and trowels to seize when walking down the garden for the weeds.—SISTER GRACIOUS.

At this season of the year more fire is needed, and vegetables grow more rapidly, a temperature of 50° in the night and 70° in the day being a good one to maintain in a vegetable house for such things as lettuce, dandelion, spinach, cress and radish.

Tomato seed for plants for spring setting sow in February, and seeds of cabbage and celery in March. Flats made from soap boxes sawed open, three inches in depth, and filled with rich soil, are capital things in which to sow seeds, as they can be moved out or in doors, or placed where desired.—W. H. BULL.

Information Wanted.—I wish to obtain direction for the preparation of the different insecticides, and the proper time of application. I think you will confer a great favor on the public if you will give a clue as to where and how the said information can be procured. Is there any recent book or pamphlet on the subject, and where and how can it be had?

[Horticulturist's Rule-Book, supplied from this office, will give the desired information, together with much other valuable matter.]



Notable Grass Book.

THE TRUE GRASSES. *By Edward Hackel. Translated from Die Natürlichen Pflanzenfamilien, by F. Lamson-Scribner and Effie A. Southworth. Illustrated. Pp. 228. Henry Holt & Co.* This translation presents to English readers the first concise and methodical account of the grasses of the world. Dr. Hackel is known as one of the best living agrostologists, and Professor Scribner is well known in the same field in this country. The work is a systematic synopsis of the order Gramineæ, with a chapter upon structure, morphology and physiology. Those who are not familiar with recent agrostological literature will find a host of new generic names and great numbers of important changes in methods of classification; and many of the dispositions are peculiar to the volume. *Zizania miliacea* is placed in a comparatively new genus, *Zizaniopsis*, leaving the common *Zizania aquatica*, or wild rice, alone in its genus, with an important varietal modification in Asia.

Cereals.

We are naturally interested in the treatment of the cereals. The common oat is supposed to have come from *Avena fatua* or some related species of southern Europe or western Asia. Rye is said to have come from *Secale montanum*, a perennial species of Mediterranean countries. This has a jointed rachis or head, and this and its perennial character have been lost through cultivation. But "rye stubble, if it stands a long time in the field, will sprout again, a thing that never happens with wheat and barley, because their original forms are annual." Wheat is said to fall into three races or groups, although only two are given: the rachis or head jointed at maturity, and the rachis not jointed. Many varieties are designated, and several plants which are regarded as distinct species by many botanists are thought to be forms of wheat, *Triticum sativum*. The aboriginal form of wheat is unknown. Barley "undoubtedly originated from *Hordeum spontaneum*, which grows wild from Asia Minor and Caucasian countries to Persia," etc. The two-rowed and six-rowed barleys, held to be distinct species by some, are considered cultural forms of barley, to which the name *Hordeum sativum* is applied. Maize is the only species of its genus, and its aboriginal form is unknown. Six varieties or groups are specified: common, pearl (pop-corn ?), horse-tooth, sugar, Cuzco, and husk. This classification is much inferior to that published sometime since by Dr. E. Lewis Sturtevant (5th Rep. N. Y. Exp. Sta. 58).

But it is in its general features that a work of this kind finds its greatest value. It enables the student to grasp the whole subject and to arrive at comparative knowledge, while at the same time its keys and details are ample enough to give a somewhat particular view of each genus. The chapter upon bamboos, contributed by Dr. Brandis, is one of the best presentations of this interesting groups yet written.

GRASSES AND FORAGE PLANTS, AND CATALOGUE OF PLANTS [*of Nebraska*]. *By C. E. Bessey and H. J. Webber. Pp. 162. Report of the Botanist to the Nebraska State Board of Agriculture.* An especial canvas of the grasses and forage plants of Nebraska has been made, and the results are given in this report, in the shape of lists of species found in various sections, introduced species, diseases of forage plants, remarks on cultivation, etc.

Flora of Nebraska.

The more important part of the report, as well as the larger, is the catalogue of plants of the state. The list includes fungi as well as flowering plants, and it differs from most, or all, American catalogues in placing the lowest orders first in the list. It also follows the extreme European views concerning capitalization and punctuation of botanical names. We had hoped that America would escape the ingratitude of writing a man's name without a capital, especially since nothing is to be gained by it. The catalogue is well made, and the notes, especially in the fungi, are full and interesting. This is the second flora of Nebraska yet attempted, the first one having been made by Professor Samuel Aughey, so long ago as 1875. 1890 species and varieties are now enumerated.

Grasses of the Southwest.

GRASSES OF THE SOUTHWEST. *Plates and Descriptions of the Grasses of the Desert Region of Western Texas, New Mexico, Arizona and Southern California. Part I. By George Vasey. 50 plates. Small 4to. Bulletin No. 12, of the Division of Botany of the U. S. Department of Agriculture.* "The region of country immediately adjoining the northern boundary of Mexico, including the western part of Texas and the greater part of New Mexico, Arizona and Southern California, is one of remarkable heat and aridity." Such is the territory covered by this attractive contribution. The grass flora is scanty, some of the species being short-lived, springing up suddenly after the summer rains and rapidly maturing, while the perennial and more conspicuous ones grow in isolated bunches. "Nowhere do the native grasses form a continuous sod, but grow in scattered bunches in connection with the low bushes which prevail on the mesas or among the chaparral." "Here one never sees the common grasses of the Eastern States. The vegetation is as different from that of the Eastern States as is that of the northern portion of the Sahara." Even the scientific accounts of the flora of this desert region are few, and popular ones are unknown. Something must be done for the country if it arises to agricultural importance, and "it is the opinion of many that this can be done by bringing under cultivation some of the native species" of grasses. Hence the mission of Dr. Vasey's report.

This bulletin is the first part of the first volume of a proposed grass book, the title of which is to be "Illustrations of North American Grasses," although, strangely enough, it is to deal only with the species of this southwestern region and of the Pacific Slope. The work will comprise two volumes.

The fifty plates in this work are lithographs, and are the best figures of American grasses that have yet been made.

Annual Report of the State Botanist of the State of New York for 1889. *By Charles H. Peck. Pp. 54. 4 plates.* Professor Peck records the growth of the state herbarium during the year, and makes many notes upon plants, chiefly fungi. Many new species of fungi are described, and a new genus, *Underwoodia*, is named for Professor L. M. Underwood, of Syracuse University. A new oat disease is described, and the fungus producing it is christened *Fusicladium destruens*. Among flowering plants, a new variety of an umbelliferous plant is described: *Sium cicutæfolium*, var. *brevifolium*, characterized by lanceolate or linear-lanceolate leaflets which are an inch or less in length.

New York Botany.

Some interesting experiments upon potato rot were made in Professor Peck's garden. It was found that Bordeaux mixture is a preventive and remedy for the disease when on the leaves. "If the foliage of the potato plant is kept whitened with the Bordeaux mixture, it can be kept free from the fungus." Deep planting was found to prevent the rot of the tuber, by preventing the spores from the leaves from penetrating into the soil. A trench was dug 12 inches deep, and the potatoes planted in the bottom of it and gradually covered until the trench was full. Very compact soil saved the tubers, also. Diseased tubers were also found, when planted, to give diseased plants.

Potato Rot Experiments.

Classification and Generic Synopsis of the Wild Grapes of North America. *By T. V. Munson. Pp. 14. Bulletin No. 3, Division of Pomology, U. S. Department of Agriculture.* Mr. Munson has long been a close student of grapes, both in their economic and botanical features. He has traveled over a great part of the Union to see them growing in their natural conditions, and for many years he has grown numbers of the wild species and varieties. He has also had access to the best herbaria and literature. It is therefore gratifying that he has given us his conclusions upon specific limitations.

It is impossible for anyone except a critical student of this difficult genus to estimate the particular values of the species as defined in this bulletin. But all can understand that a logical and comprehensive view of all our species marks an epoch in the knowledge of native grapes.

American Grapes.

Mr. Munson describes 25 native species and two European (*Vitis vinifera* and *V. Bourquiniana*). These fall into eight series or divisions. Six species are first described by Mr. Munson: *Vitis Doaniana*, *V. Girdiana*, *V. Bourquiniana*, *V. Simpsoni*, *V. Virginiana*, *V. Blancoii*. *V. Munsoniana* is a rotundifolia-like species from Florida, proposed by Mr. Simpson.

Bulb Culture. *By Peter Henderson & Co. Pp. 24. Illustrated.* This is a useful pamphlet to all lovers of fleshy rooted plants. It is compiled much in the catalogue style, being arranged alphabetically. It discusses tuberous-rooted plants as well as true bulbs.

Bulb Book.

Plants Collected in 1889 at Socorro and Clarion Islands, Pacific Ocean. *By George Vasey and J. N. Rose. Reprint from the Proceedings of the U. S. National Museum.* In 1889 the United States Fish Commission steamer, Albatross, visited various islands near our Pacific coast, and at Socorro and Clarion, in the Revillagigedo group, a collection of plants was made. These little islands are 260 miles south of Cape St. Lucas, Lower California, or about on the latitude of the city of Mexico, and are about 300 miles west of the Mexican mainland. Island life is always interesting, particularly in reference to distribution and variation. Only 26 species were collected upon these islands, yet three of them are new, one having been previously collected, however, in the southern part of Lower California. The flora is Mexican in its type. We wish that the authors had made some more extended remarks concerning the relationships of this flora.

Island Botany.

Notes on the Leaves of Liriodendron. *By Theodor Holm. Pp. 22. Plates IX. Reprint from the Proceedings of the U. S. National Museum.* Dr. Holm was attracted to the variation of leaves in the common tulip-tree by a study of the leaves of small seedlings. Continuing his observations, he found that the species is remarkably variable in foliar characters, and that the descriptions in our botanies are not only entirely inadequate, but are often erroneous. These observations led to a critical examination of the fossil species of liriodendron. The geological history of them is interesting, inasmuch as but one species now exists, and this is confined to eastern America and China. In cretaceous time the species are supposed to have been numerous. These fossil species have been founded entirely upon imprints of leaves. Dr. Holm shows that the variations between many of these old-time forms is not greater than those which now exist even upon branches of the same tree. Some fourteen fossil species have been described, but the author thinks that the number must be considerably reduced.

The Tulip-tree.

He thinks that our recent species existed so long ago as the pliocene. He attempts to arrive at some conclusion as to the generic origin of the tulip-trees, and he is led by certain leaf characters to suggest some magnolia or magnolia-like type as the progenitor.

Text-Book of Agriculture.

THE FIRST PRINCIPLES OF AGRICULTURE. *By James Mills, President, and Thomas Shaw, Professor of Agriculture in the Ontario Agricultural College. Pp. 250. Illustrated. Toronto: The J. E. Bryant Co.* This is an admirable book. It is designed for use in the "third and fourth classes" of the Ontario public schools. It contains more of the gist of agriculture and less of irrelevant and abstruse matter than any book of twice the size which we have seen. It is particularly admirable in its definitions and methods. It is pruned of wordiness. Its sub-heads and correlative statements are logical in arrangement and direct in application. Succinct reasons and advantages of certain practices are given throughout the book, of which the following "points of merit in plowing" may be taken as a random example:

"1. A straight furrow of uniform depth and width.

"2. A clean cut as to the furrow, both on the side next the unplowed land and on the floor or bottom; and hence, correspondingly clean cuts on the exposed edge and top of the inverted slice.

"3. The complete burial of the grass and stubble turned over.

"4. A ridge even and uniform, with a finish showing an open furrow with a clean, narrow bottom. The last furrow-slice should be about equal in width and height with the others."

The book deals with general farm science and practice, farm crops, feeding and breeding of animals, dairying, silos, etc. Its method is eminently adapted to schools, and it must prove very useful in them if seriously introduced. And to everyone on a farm it presents the best series of definitions and the objects sought by common operations of any book we have ever seen. The mechanical execution is unusually good.

Strawberry Book.

HOW TO GROW STRAWBERRIES. *For Farmers, Village People and Small Growers. A Book for Beginners. By T. B. Terry and A. I. Root. Pp. 144. Illustrated. Paper, 40 cts. A. I. Root, Medina, Ohio.* This is a chatty and attractive account of the whole matter of strawberry culture and management. It is written in a manner to interest as well as to instruct; its anecdote and reminescence will undoubtedly popularize it with most readers. The authors are well known as successful strawberry growers, and they have given greater attention to many useful little details than others have done.

Botany of Lower California.

LIST OF PLANTS COLLECTED BY DR. EDWARD PALMER IN 1890 IN LOWER CALIFORNIA AND WESTERN MEXICO. *By George Vasey and J. N. Rose. Contributions from the U. S. National Herbarium [Dept. Agriculture] No. III. 1 plate.* The botany of Lower California is little known. Dr. Palmer and Mr. Brandegee have lately made explorations of portions of it, and have discovered an interesting lot of new species. The flora is essentially a desert one. Of the plants known in southern Lower California, 76 have also been collected upon the mainland of Mexico, 56 extend into the desert regions of the United States, 10 reach Central America and 8 are South American.

Coulterella, a New Genus.

A new genus, *Coulterella*, named in compliment to Professor J. M. Coulter, of Wabash College, is described. It is a composite, of doubtful affinity. There is but one species, *Coulterella capitata.* It is a "shrub with many branches, forming a large bush four feet high," and bearing "a strong aroma of the oil of lemon." It occurs on a sandy beach near the ocean.

American Parks.

ON THE PUBLIC PARKS OF AMERICA. *By the Rt. Hon. the Earl of Meath. Report to the Parks and Open Spaces Committee of the London County Council. Pp. 34.* The Earl of Meath has made a particular study of the parks and park management of America, and he gives his colleagues upon the London park committee the results of his investigations. He has examined our enterprises in an excellent spirit, and he has frankly pointed out their saliant virtues and defects. It is needful that we should have outside criticism. The distinguished author sees much more to admire than condemn in our parks, and he recommends no less than seventeen features of them as "worthy of imitation." These especially commendable features are electric lighting, boulevard systems, the more or less permanent character of the commissions, the control by the park of certain lands and privileges adjoining it, the separate employment of landscape gardeners and architects, the zoölogical attractions, gymnasiums, and several provisions for picnics and amusements.

"A veritable rage for park making seems to have seized the American public." The result of haste and enthusiasm is often seen in too great artificiality or in features of too striking character. The author's opinion of Central Park, New York, is to the point: "Nature seems in this latter park to be placed under such continual supervision and surveillance of man, so cribbed and cabined by police regulations that artificiality takes the place of natural beauty, and a man has a sense almost of relief on leaving the gardens, feeling thankful that at length he may walk on the highway or pick up a dead leaf without fear of arrest."

A good list, with areas and notes, of the parks and open places in the leading cities of the country is added.

L. H. B.

Supplement to THE AMERICAN GARDEN.

The Window Garden

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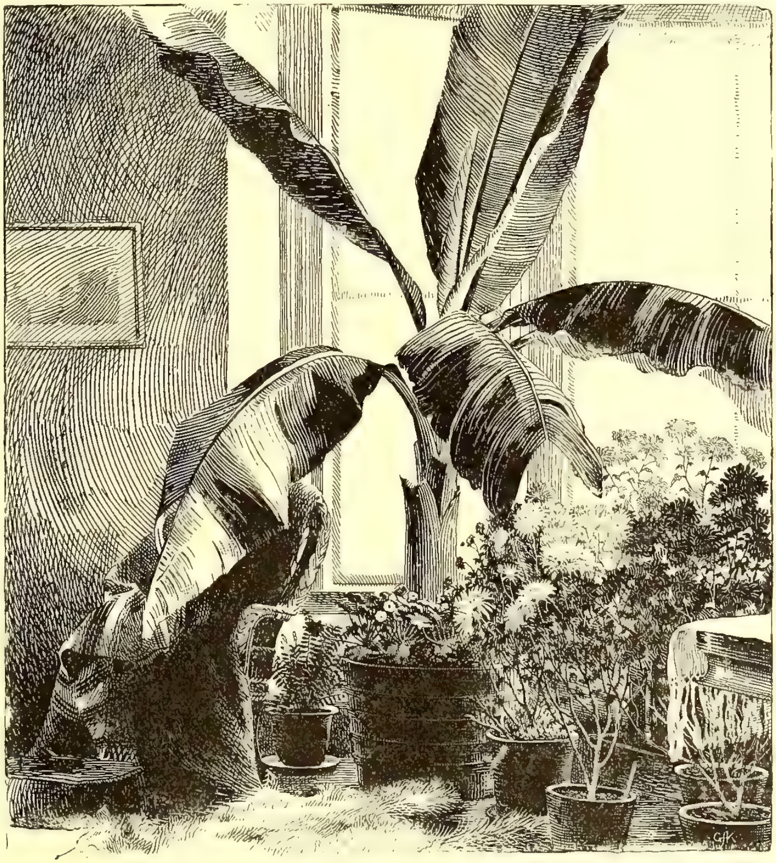
INDOOR GARDENS.

THE DELIGHTS AND POSSIBILITIES OF WINDOW GARDENS.

THIS subject, a most interesting one, is by no means easily handled by the practical gardener, for many difficulties present themselves which more or less revolve about the personal equation point. This is very likely called "love of plants," but it more nearly means the powers of observation and memory which enable one man or woman to see more closely into the conditions necessary for healthy plant-life, and not only to draw the correct deduction, but to put the knowledge so obtained to the proper use at the proper time. It is true that this does not apply to this form of gardening any more closely than to other agricultural and horticultural work. "Note the cause and obtain (if you can) the effect;" but all things considered, the life of a plant in a living room, with ordinary care, is precarious.

The conditions which obtain in rooms made for family use are not those best adapted to plant growth; in most cases growth under glass is strained, to say the least, and of all artificial methods of plant-growing, in window gardening we have the most marked; there is nothing here advantageous to the plant except protection, and this often results in too high a temperature. We must contend against a dry and dusty atmosphere, against too little light, against a certain lack of care, chiefly in giving water and in washing off dust and insects, and it is in this last function only that we can exercise much control. All this is a pity, for nothing is more ornamental than well-grown plants, nothing fits more readily into a room than flowers or foliage. Almost



A COSY CORNER.—MUSA ENSETE AND CHRYSANTHEMUMS.

any growing plant will "match" with the surroundings.

Since the dry and dusty air and too little light are the chief obstacles, we must select for our purpose those plants best capable of resisting these influences. We must grow them in such a way as to provide the maximum amount of water, fresh air and light, and must not neglect the necessary care. My plan is to have a number of foliage plants—palms, cycads, ficuses and the like—which might be called permanent plants, and from time to time I introduce among them flowering plants, to give color and add interest and variety to the group.

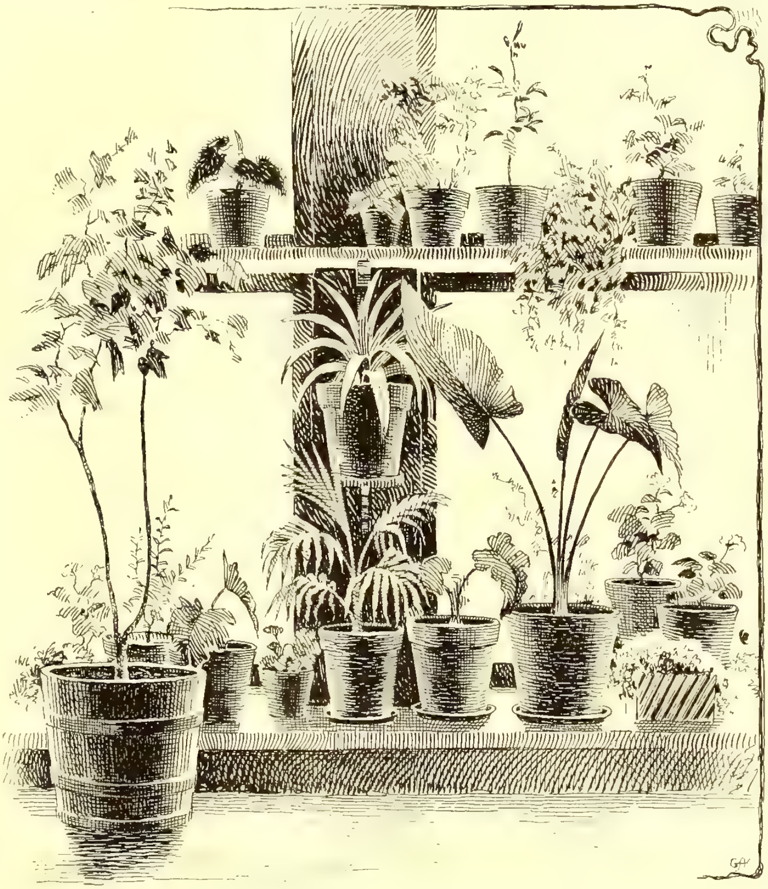
Before making any list of plants suitable for this purpose, it will be well to consider certain general directions in the way of preparation, in order that we may start fair, with healthy specimens. Rotted sods, rotted cow manure, leaf-mould and sharp sand in about equal parts make a potting soil fit for growing almost any plant; the sand may be used in smaller quantities, and peat, if good and well seasoned, can be used in addition for many things or substituted for leaf-mould. Mix carefully and let the mass stand some weeks before using. It is not well to use anything smaller than a six-inch pot for house plants on account of the difficulties with the water supply. So I advise the use of drainage; an inch or two of potsherds, depending on the size of the pot, covered with a thin layer of sphagnum. Pot firmly, taking care that the soil is not dry, and that at least one-half inch of space is left below the rim of the pot so that a good allowance of water can be given at one time. Plants should be potted just before making their season growth; this is generally in spring, so as much as possible of this work should be done then. Plants growing in the open ground during the summer should be lifted at least a month before bringing into the house. Keep for a few days in a shaded place, and do not over-water. The soil must be moist, but not wet; sprinkle the leaves if they flag, but do not water at the roots unless the soil is dry. Plants potted in the spring can be plunged in the open ground in summer or kept on the piazza or on the gravel-walks. They require plenty of water, a free circulation of air, and an occasional rain is grateful; much of the winter's success depends upon the good growth made in the open air.

I consider it important to bring plants into the house before the fires are lighted. Most houses are too warm as well as too dry; and in this way they will become accustomed to their surroundings before the dryest and hottest time comes, viz: when the furnace fires are started and the gas or lamps are burning constantly. Any change is bad for growing plants, and is always to be avoided; if unavoidable, prolong this period as much as possible. The change from growth in the open air to the house is great, and anything which can be done to lessen it is a boon. When the plants are brought in, the sunniest windows are to be chosen. At first, give them the coolest rooms, and those in which the most fresh air can be given daily. A good expedient to reduce the dryness of the air is to have a box two or three inches deep, fitted with a pipe through which the surplus water can be removed. This will hold the pots, which may be plunged in damp moss. By this means much moisture can be thrown into the atmosphere; such a box can be made in various sizes and shapes to fit different windows, and materially helps in the care of the plants. By using some of the handsome mosses a very attractive appearance can be given. Plants should never be over-potted; but the larger the pot the greater the volume of the soil, and the less change consequently in moisture and temperature, so good-sized pots are desirable. By the device of setting the pot, when possible, below the window sill, shade is obtained and the evaporation from the sides reduced. Glazed pots can be used advantageously, but there should always be a hole at the bottom.

The proper time for that most important part of plant culture, watering, is during the morning in cold and at night in warm weather, and it should be done regularly. My experience is that a given number of plants require about the same amount daily, but the demand is irregular, and it is always a delicate matter to meet it. The soil of any plant with green leaves or pushing roots should never become dry; enough water should be given to keep the soil moist to the bottom of the pot, and, if possible, this should be given at one time. This generally means that you must water so that a little will escape through the hole at the bottom, and I have found it a good plan, with strong and well-established plants, to allow this surplus to remain in the box or saucer for half an hour or more. Part of this will be sucked up again, but if any remains at the end of this time it must be removed; it would injure most plants to have free water constantly at the roots. The stronger the plant, however, the better it would stand such treatment. A good healthy English ivy or well-rooted fern is sometimes helped by allowing the water to remain for several hours. Give plenty of air, even opening the windows directly upon them when the day is bright and not too cold; avoid drafts or any great changes in temperature. Use water in the furnace, or better still, have a tank in the register; it is astonishing how much water can in this way be evaporated within a short time. Wash the plants often, not only to get rid of insects but also to clean off the dust; a little warm water applied with a sponge, using soap or Gishurt's compound, is a great help to all foliage plants, like palms or ficuses.

There are few plants which can be recommended for house culture which will not stand the tempreature as low as forty degrees, and even below this on occasion. It will be found that plants do best in those rooms which have a comparatively low night temperature—forty or fifty degrees. Sometimes, therefore, a spare room, an attic or bed room, can be used to good advantage as a "feeder" to the living rooms. Plants often thrive in the kitchen, if sunny, largely owing to the moisture.

I shall divide the plants suitable for window-gardening into two classes; a permanent set, likely to be of interest all the year round, made up mostly of foliage plants; while the second lot would be mainly flowering plants which could be either grown in the house for the purpose, or better still, bought from time to time of the florist just as one would buy flowers; only the plant will generally be less expensive and will last much longer. If one has a greenhouse this part of the problem is easy and does not need elaboration. For permanent plants, I will name only those with which I have had personal experience for several years, and have found in every way desirable; we have here both gas and a furnace, but keep what would be called a cool house. The palms come first: *Latania Borbonica* (*Livistona sinensis*) *Chamærops Fortunii Corypha australis*, and *Phœnix reclinata* are all good in every way, and will stand almost any variation likely to occur. *Cocos plumosa* is good, but requires a little higher temperature; undoubtedly others could be added to the list. They are kept most of the time in the windows, but are often used for weeks away from direct sunlight. *Ficus elastica* is probably among house plants what the Baldwin is among apples and the Concord among grapes — always reliable and always giving a good return for the investment. Be careful not to let the room get suddenly overheated, and be sure that the pot or tub is not dry at the bottom; otherwise you may lose the lower leaves and injure the beauty of the plant but even then you can cut it back and start afresh. Other ficuses that are also good, are *F. ferruginea* and *F. Indica*, the banyan tree. *Cycas revoluta*, the sago palm, ranks with the above-named plants; it is rather difficult to handle the young plants and large ones are expensive, but it succeeds admirably in a room which is not too hot, and certainly nothing can be finer. If kept too warm it is likely to start into growth too early, and as a result the young leaves are often nipped in the dry atmosphere. The green-leaved cordylines and dracænas are good and easily handled; so too, is the screw-pine, *Pandanus utilis*—they seem capable of standing any vicissitudes, and group well with the palms. The New Zealand flax, *Phormium tenax*, is fine and well adapted to the house; probably the same could be said of the variegated variety. *Grevillea robusta* has always done well with me; it is a beautiful plant, and although a sudden change or neglect in watering will cause the casting of the leaves, it very soon recovers itself with a new set. Among ferns there is nothing better than the sword fern, *Nephrolepis ensiformis*. There seem to be several varieties or species, all of which are excellent; one must be on guard here against scale. *Musa Ensete* thrives, and the leaves are not torn as they are in the open; they must sometimes be supported by guys from the ceiling, and frequent washing alone will keep down the red mite and mealy bug. If this is not done the plant will fail before the season is over. The English ivy is always attractive, and seems to grow at its best. It is a mistake to keep old plants too long; either cut back or get fresh stock and so start anew. This seems to grow in less light than almost any other plant. Tradescantia will succeed, and so will aspidistra, almost anywhere, but they are uninteresting in comparison with these others. I find the Portugal laurel, English holly, Irish yew, *Araucaria imbricata*, *Cryptomeria Japonica*, and maybe some other half-hardy plants are thoroughly good if they can be kept cool, but a low temperature is a *sine qua non*.



SISTER GRACIOUS' WINDOW GARDEN. (See page 769.)

Now with a background made up of thick fine foliage it is very easy and inexpensive to introduce from time to time flowering plants which will add color and life. Perhaps cyclamen and Chinese primrose should have first place, because they continue in bloom such a long time and give a good variety in color. They must have the best light and air and great attention in watering; when properly cared for they will last a long time in good condition. The Dutch bulbs are desirable; tulips, narcissus, and hyacinths are much more satisfactory if used as pot plants than as cut flowers, and this, too, even if not kept in the windows, but disposed upon the tables away from direct light. They must have plenty of water and should always be brought into the house before they are in full bloom. It is quite possible to handle this class of plants without professional assistance; the cool cellar or cold frame will give them a good start, and then they can be carried along in the cool upstairs rooms until ready to flower; a little experience will enable one to have a succession. Chrysanthemums are like Dutch bulbs, much finer growing in pots than when used as cut flowers; in a fairly cool room, if well watered, they will last for several weeks and make a much more characteristic appearance than if taken from the plant and put in vases. Many flowers will not readily lend themselves to artificial arrangement in bouquets and the like; this is strikingly true of these last-named plants.

Scarlet geraniums are effective, but require bright sunshine; the plants should not be too large, and they should be well prepared beforehand. *Azalea Indica* lasts a good while in bloom if kept fairly cool; they can sometimes be grown in an attic and brought into the living rooms in full flower, and then put back to make their growth. Cinerarias will do well when grown in a greenhouse and brought into the parlor; the large leaves will flag and dry up, but if they are carefully sprinkled for the first few days this is not so noticeable. *Daphne odora*, laurestinus, hydrangea, oleanders, agapanthus and *Vallota purpurea* can often be wintered in a light cellar and brought into bloom either in the house or on the piazza or lawn; a furnace-heated cellar is too warm generally, and some provision must be made to keep the temperature low. Very little water need be given these plants while at rest.

Bussey Institution.

B. M. WATSON, JR.

MY WINDOW GARDEN.

A NUMBER of years ago I had a very strong desire to make an attempt at window gardening, but was compelled, like many another, to content myself with a common window. There were two windows in the room, one on the east and the other on the north side. Of course the east one was selected on account of the more sunny exposure.

The room was not very well lighted, and as light was one of the chief requirements of success, I contrived a plan to trap all of the rays of light possible, and although the affair was a very crude one, the result was quite satisfactory.

I made a very light frame of wood that extended from the top to the bottom of the window casing and across the top. It projected perhaps a foot from the window, and was covered with bleached muslin.

There were two or three shelves on brackets fastened to the window casing, and underneath all was placed a zinc pan to catch the drippings when the plants were treated to a shower bath. I never had as good success with geraniums and coleus as during that season. Lace curtains draped over the whole produced quite a pleasing effect.

My next venture was a little more elaborate, and although not quite so satisfactory as it would have been in a more favorable location, yet the success I have secured with certain plants is quite flattering.

The undertaking this time was to enclose a portion of an eastern porch, the entrance being effected by removing a window and making of the opening a door-way which was draped as the remaining windows in the room, with the lace hangings.

The floor of the porch was allowed to remain, and another one was placed above it, level with the floor of the room adjoining—the space between being filled with sawdust. On each of the three exposed sides of the enclosure were fitted two windows, both an inside and outside set, making in all twenty-four sashes. The hollow space in the casings between the windows was also filled with sawdust.

Around the three sides, resting on the floor, and about nine inches in from the casings, a board was set on edge. This board was nearly wide enough to reach to the top of the window sills. Another board was placed under the window sills and sawdust was put in between the two. A wide shelf rested upon them. Another shelf of narrower dimensions was placed upon iron brackets secured to the casing, and just level with the top of the lower and bottom of the upper sashes. It has been my observation that better taste is exhibited by arranging the shelves in such a manner that the edges are not noticeable when viewed from without, and by adjusting them in this way this objection may be avoided.

Around the outside of the shelves was tacked a moulding that projected half an inch above, and before the plants were put in place these shelves were covered with clean sifted sand. This sand I find is quite an advantage, as it keeps more or less moist and helps to produce a more humid atmosphere for the plants, since the surplus water from the frequent showerings is absorbed by it.

I have found that during very severe weather, especially with an east wind, it is quite difficult to keep out all the cold, and I have profited greatly by a suggestion somewhere offered, to paste strips of writing paper over every crack possible. Where the wood work is painted white the paper is not at all unsightly.

For the first few years that I had this little plant room I experimented with a great many different kinds of plants, but each year's experience convinces me that I can succeed with only a limited number. I have failed year after year with geraniums, coleus, heliotropes, callas and anything requiring a higher temperature and more sun.

Smilax grows quite luxuriantly. The English ivy does well, and one or two varieties of begonias—but the most of them do not flourish on account of the lack of heat.

The plants that give me the greatest pleasure, however, are the maiden-hair ferns and the Chinese primroses. The former are beautiful, and the latter grow so thriftily and blossom so profusely all winter long that they are a great delight.

I had quite a satisfactory experience with cinerarias last winter; I grew them from seed. The great pest with which to contend in their culture gave me no trouble whatever; I refer to the green fly or aphis.

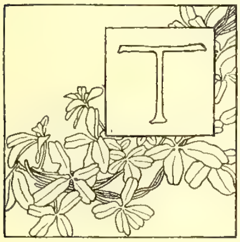
I take cuttings from my geraniums in the fall and keep them in small pots for outside blooming, and they grow well during the winter, but fail to produce many flowers while confined in the house. Large plants do not blossom well, either.

I have read oftentimes that one should turn the plants frequently on the shelves to expose all sides alike to the light, but it is my opinion that they do far better if they remain very nearly in the same position. It seems as if they spent too much of their vitality in adjusting themselves to the change, for it is plant nature to look toward the bright side, at least.

The usual manner of heating this room is simply by the heat that would naturally come from the adjoining room, although during some extreme cold weather a kerosene lamp or stove has been placed in it during the night-time.

Michigan. ALICE R. GARFIELD.

SISTER GRACIOUS' WINDOW GARDEN.



THE sitting room was long and narrow, with a bay window filling one end, with plenty of sun for my beloved plants. I made a plan, and then sent for a carpenter. First, the inside blinds were removed, and then six iron brackets screwed on half way up the window; and three shelves that were cut to fit the windows were put on the brackets. I also had two brackets fastened on each side to hold pots. Then a long shelf was made to fit in the lower part of the window. The whole could be removed in a few minutes and packed in the back shed, when the plants were put out into the garden.

There was a small stove in the room, and every morning I put a tea-kettle of boiling water on top of it, thus furnishing the moisture which plants require. The kettle could be whisked out of the way when visitors came. For protection in very cold nights I had three large pieces of card-board, which I bought at the bookbinder's, that just fitted the window. I made a cloth case for each piece so that it would cover the card-board tightly and smoothly. These pieces could be put between the window and the plants, and they always kept the frost out.

My window was the delight of my heart as well as of the neighborhood. I had flowers all winter. An abutilon is a valuable plant for the window garden. Mine bloomed and bloomed. Also my calla, which I roll under the back fence every summer, and there let it care for itself. The last of August I repot the bulb, putting a little hen manure in the bottom of the pot, and from Thanksgiving time until spring the royal flowers rejoice my heart. Begonias filled one shelf, and I have a mania for collecting different kinds. There are so many varieties, and some so lovely, that it is the most fascinating of hobbies. And there was the tropical shelf, upon which was an orange tree from seed, also a pine-apple. Pine-apples are very easy to grow. Cut off the crown in the summer, put it down an inch or two in soft earth, and it will be rooted by fall. It must be potted before the cold nights come. Dates can easily be grown from seed. The plants are interesting to watch, but not remarkable for their beauty.

My hyacinths smiled at the passers-by in early spring. I pot them in October and bring them out after Christmas. Every year I buy a bulb of the Chinese sacred lily. Our best preserve dish filled with water does duty on the plant stand for the lily, which is propped up with pebbles. The flowers are so sweet, and the whole plant so interesting, that it pays to have one.

As for vines, an English ivy is on one side of the window and a cobœa on the other. A cobœa hardly grows; it dances along the string given it, and will soon be at the top of the window, with its rich purple flowers showing amid the glossy leaves. My window garden cost six dollars and fifty cents for carpenter work. The plants were slips given by the neighbors or exchanged. Now and then a new one was bought, and my family grew in numbers and interest as the months went by. My window garden led to outdoor work, and from a nervous sufferer from catarrh, I became a well woman and a very happy one. SISTER GRACIOUS.

WINDOW GARDEN NOTES.

I SHALL not attempt to give any hints or instructions to those who have bay windows and plenty of money to expend on plants for their embellishment, but solely to those who are amateurs, with ordinary windows which they wish to fill with such plants as will prove most ornamental during winter.

If one can have a handsome galvanized-iron stand, bronzed or painted, and the top fitted or made in the form of a tray, it is a very attractive receptacle for ornamental foliage plants and free bloomers. If this stand cannot be afforded, a nice pine box lined with zinc, of a size adapted to the stand or table on which it is to be placed, will answer very nicely. The box can be stained or painted any color you fancy. I had one made ten years ago with zinc, and to give it strength it was framed with wood at the top. It is much lighter thus made than when of wood and lined. Mine was three feet long, fourteen inches broad and seven inches in depth. It is good for service yet.

I first put in something coarse for drainage, and then fill in with rich, mellow soil which is about one-third fine sharp sand. Being a great admirer of begonias, I planted several varieties, choosing rather such as are handsome in foliage ; yet one can rely on their blooming pretty well in the winter. I never use the Rex for this purpose. Gloire de Sceaux is both ornamental and a free bloomer. The foliage is a dark bronzy plum color ; flowers borne freely in clusters, color a lovely pink ; of compact habit.

Rubella has velvety, deeply-pointed leaves, the ribs of which are banded with purplish brown, while the ground is a pallid green, blotched with red. Manicata, var. aurea is the most beautiful in foliage of any begonia I have seen. The leaves, which are thick, are finely blotched with cream color, deepening into canary, with now and then a bit of pink. It bears clusters of pink flowers. Subpeltata, var. nigricans, has foliage of a dark red, with a silvery surface. Sonderbruchii, foliage divided into nine sharp points ; bright metallic-green, veined and shaded with black. It bears large panicles of pinkish white flowers, well above the foliage.

I need not name more than these, which are well adapted for the box. I always have a few small plants of abutilons, as they are reliable for flowers. For beauty of foliage and its light drooping habit, I admire Mesopotamicum, with its small pointed leaves, elegantly marbled green and yellow, while its pendent bells of crimson and yellow grow profusely along the slender branches. Darwinii is also well adapted for the box, because of its dwarf habit and its free blooming character. It blossoms when only a few inches in height ; the flowers are very open. Color orange scarlet, veined with pink and borne more in clusters than singly.

Coleuses are admirable to brighten up the box, and vines can be set in the corners to droop over and twine around it. Of course the plants must not be very large when set out if one would have many, as they would soon crowd each other. I set the largest in the center and put very small ones next to the box, and these will make nice plants for bedding out in the spring. I did not find it necessary to water the plants oftener than twice a week, for they do not dry out as in pots.

Another way of arranging plants to have a pretty effect is to have brackets, each holding two or three pots, fastened to the window casing one above another at proper distances. Three on each side of the window will make it a bower of beauty. The brackets can be swung outward when one wishes to drop the shade, but the plants will so cover the window as to render this hardly needful. For these brackets the larger leaved begonias than those I have specified are admirably adapted. Olbia is one of rare elegance. The leaves are large, deeply pointed, and of varying shades of brown and red, giving them a changeable appearance. The veins are so sunken as to give the surface a crapelike appearance. The plant soon has a stout main trunk, from which the branches grow in an erect form. It has racemes of large lemon white flowers.

Semperflorens, var. elegans, is a very fine variety which grows to a height of twelve to fourteen inches, and has a compact mass of glossy olive-green foliage, sharp pointed and toothed. The flowers are rosy-white and many of the florets are double, having larger outside petals, and a double rosette center.

Argentea, var. guttata, is a cross between olbia and alba picta, and combines the silvery blotches of picta with the form and beauty of olbia ; flowers white.

Ricinifolia has very large leaves which are divided into seven or more deep points ; they are borne on thick stems eighteen inches or more in length ; color a rich green with reddish markings. The bloom is magnificent ; color pink.

For a trailing begonia, glaucophylla, var. scandens, is fine ; flowers orange colored.

The aspidistra is an excellent window plant. Variegata has long lance-shaped leaves, broad, and striped with white. It is very easy of culture.

Pandanus or screw pine is very ornamental for a bracket. *P. utilis* is the one most generally cultivated. *P. Veitchii* has leaves striped with creamy white. The long narrow foliage droops very gracefully.

The new abutilon, Golden Fleece, I find to be all that is represented ; it bears large golden bells in profusion.

I might specify many more beautiful plants, admirably adapted for box and pot culture, but I consider no window garden complete without the bulbous flowers, hyacinths, freesias, etc., etc., not to omit the Chinese sacred lily, a most interesting plant in its way.

Yarmouth, Me. MARY D. WELLCOME.

THE CULTURE OF PELARGONIUMS.

I HAVE been quite successful in the cultivation of the pelargoniums, and think if their needs were better understood, that they would be more often seen in the window-garden. Many err in giving them too much pot-room, and also in keeping them in too high a temperature.

A four-inch pot is sufficiently large for almost any pelargonium, though I occasionally put a large two-year old plant into a five-inch pot.

Another mistake is to give too much water during the fall months. A room having a temperature of 40° to 50° suits them and in such a room I keep them till the ends of the branches look thick and stout and buds become visible. Then I remove them to the warm temperature of the sitting-room, where they are placed in the broad sunny bay-window to be forced into bloom. Some stimulate with liquid manure when buds first appear, but this is wrong, as it induces growth at the expense of blossoms.

Now I have learned to wait until the plants are well in bloom before stimulating and obtain much better results.

A good, well-behaved pelargonium should remain in bloom and be a "thing of beauty" for six weeks, and some have remained beautiful for two months. With me the early varieties commence to flower in December, and then others follow till in April and May they are making a fine showing. I have had some of the dwarf varieties literally covered with flowers, and have counted nearly forty clusters of buds and blossoms on one plant, at one time.

I am convinced that one can raise pelargoniums successfully without a greenhouse. Indeed the best and finest ones I ever saw were raised by a friend, from cuttings, kept through the fall and early winter in a cool room ; and when buds appeared they were forced forward in a warm and sunny bay-window.

She started them in July in small pots, and when the pots were full of roots, pinched back the top, to induce side growth, and then re-potted in pots a size larger, say three, or three and a-half-inch ; then again into four-inch pots when they needed it, pinching off the ends of refractory branches to make the plants symmetrical. This last re-potting was usually done in November. The dwarf varieties are always of good shape, but it is more difficult to get the large varieties to grow symmetrically. During the blooming time my friend's bay-window was a bower of beauty. It was always pretty with its trailing vines, lovely ferns, bright blossoms and foliage plants, but while the pelargoniums were in flower, it was the delight of all beholders. All stopped to admire it in passing.

I had a strange experience with a plant of Freddie Heinl last spring. I raised it the year before from a cutting, and its first season's blooming was quite correct ; but last spring, when about two years old, it behaved strangely. It had six main branches—three of which bloomed like the parent—pure white, with rose-colored blotches, but the other three had much darker flowers, resembling Freddie Dorner in color. The same plant I kept for another season's blooming, though I do not generally keep them more than two years—this is three years old. The plant is now budded and I await the result with interest.

The above named varieties are the earliest to bloom. I have sometimes had blossoms in December ; and they bloom for months, unlike the other varieties.

There is one difficulty in the culture of the pelargonium. They are often troubled with aphides, but frequent smoking with tobacco will keep away the offenders, and an occasional washing and sprinkling is also beneficial. They will be esteemed fully worth the little trouble it really is to grow them carefully.

Massachusetts. MRS. M. J. GIDDINGS.

GOOD PLANTS FOR THE WINDOW.

SUBJECTS NEW AND OLD FOR WINTER BLOOM.

FOR the encouragement of our women florists I would say that I have never seen a commercial florist who could grow plants better, with the same appliances, than I have seen hundreds of women grow in windows and living rooms. Passing along a street in Baltimore a number of years ago, in company with a friend who was extensively engaged in the florist trade, I made this same statement on seeing a handsome stand of flowers in the window of a modest home. "I have often said the same thing," said he, "for I feel sure that with the same conveniences I would fail to have such plants as that lady has. It is mainly the minute patient care which a woman will bestow on her pets, and which few men will. I employ a number of Dutch women in my greenhouses, and find each one of them worth any two boys I could hire for nearly the same money." Women and flowers harmonize better than men and flowers. It is not my purpose to enter minutely into the details of window gardening in this short article, but merely to call attention to many plants that can be well used for that purpose.

There is in all collections of window plants too much of a monotony of zonale geraniums and callas, while there are a multitude of other things which will give variety and make the work more interesting. What all plant lovers want is *bloom* in winter, and this is what most collections lack. Unless an unusual amount of sunshine can be commanded, but little bloom can be had on the ordinary geraniums so much grown. The great tribe of begonias has many members which are inveterate winter bloomers, and get along with less sunlight than some other plants. The ornamental-leaved begonias of the Rex type I do not recommend for window culture. Though some women succeed with them, their foliage usually lacks the luster imparted by the moist air of the hot-house. There are, however, many sorts handsome enough in foliage and profuse in flowering that any women can handle with ease. First among these is the variety commonly grown as rubra (*Begonia corallina*). This is a tall-growing species, with enormous racemes of coral red flowers, and it should have the most sunny posititon of any of the tribe. It ripens seed abundantly, and seedlings from it vary in all the shades from crimson to white. It is hard now to get the variety true, because florists find it easier to grow it from seeds than from cuttings; but a packet of seed will always give a few plants true to the type.

The seeds of begonias are exceedingly minute, and I have found that the best way to germinate them is to prepare a pan of mellow leaf-mold, make the surface smooth, and then with a fine sieve rub a thin layer of dead sphagnum over the surface. Water this with a fine sprinkler, and then scatter the seed over the surface. Cover the box with a piece of slate and set it in a sunny window. The slate readily absorbs heat and will keep a good temperature in the soil and retain the moisture, so that watering can be avoided. As soon as any signs of germination appear, replace the slate with a pane of glass to give light and still retain the moisture, and as the seedlings advance gradually withdraw the cover, and finally transplant them by lifting on the point of a pen knife.

The purpose of this article, however, is not so much to give details of culture as to suggest species not so commonly cultivated. There are many other varieties of the winter-blooming begonias that will be found very effective, but I can here only suggest them: *B. Saundersonii*, bright carmine, very profuse in bloom; *B. nitida*, var. *alba*, white, handsome in leaf and free in bloom when not allowed too much pot room; *B. semperflorens*, var. *alba*, white, blooms continuously and buds out well in summer; perfectly hardy in sheltered places in this latitude, and easily grown from seed or cuttings; *B. argyrostigma*, erect, with leaves permanently spotted like seedling begonias usually are at first; *B. picta*, like the above, but of smaller growth; *B. fuchsioides*, red, and less free in bloom than some others; *B. hyb. multiflora*, small leaved, free grower and good bloomer; pink. *B. Evansiana* or *discolor* is frequently grown as a house plant for its foliage, but it is not properly a house plant, as it blooms only annually and in autumn. It is a bulbous sort, perfectly hardy, and should be left out in the garden in a moderately shady spot, where it will make a grand autumnal show of pink flowers.

Among the bulbs offered in autumn by florists, there are many not commonly grown by window gardeners that deserve a place. Hyacinths and crocus, of course, every woman knows, but there are many other bulbous plants equally interesting and easy to grow. *Freesia refracta* is one of these. The bulbs are small, and eight or ten may be planted in a six-inch pot. They should be placed close to the light, when they will give a profusion of bloom very useful for cutting. They also have the advantage that the bulbs increase rapidly under pot culture, and if properly dried off after blooming, the grower will soon have a stock to give to friends, and will not be obliged to purchase annually. The various sorts of narcissus are easily bloomed in window culture, especially the Chinese sacred narcissus, which in freedom of bloom exceeds all others. *Allium Neapolitanum*, like freesias, increase very rapidly in pot culture. They give large heads of white flowers, and the grower will soon have an embarrassment of riches in the shape of bulbs.

Cyclamen Persicum is one of the most satisfactory of window plants. The bulbs or corms should be planted in pots not more than twice the diameter of the bulb, as they dislike over-potting. Set the bulb *on* and not *in* the soil, only covering the roots with soil. Until growth begins, great care must be taken not to get too wet, and no water at any time must be poured on the top of the bulb, as water standing on the flat-topped corms will cause the flower buds to decay. Many amaryllis make very satisfactory plants for the window in early spring, especially those of the Johnsonii type. These bulbs are better if never entirely dried off. Keep them in pots, and in summer plunge the pots in the soil in open sunshine and allow them to take their chances. In autumn remove to a light cellar and keep the pots only barely moist, bringing them to the window as the blossom buds appear on the sides of the bulbs. In North Carolina these bulbs are treated just as other hardy bulbs, and are allowed to remain in the open ground, where the clumps increase in size from year to year and make a magnificent display. But in any climate where it is too cold to leave cannas, dahlias and gladiolus out, it is best to grow amaryllis in pots only. Our native *Amaryllis Atamasco*, which makes such a show in every moist spot here in spring, is also easily grown in pots, placing three or four in a six-inch pot.

In the way of greenhouse shrubs, the oleander has long been a favorite, but the newer sorts, particularly the semi-double *N. Madouni*, var. *grandiflora*, pure white and profuse, should be more grown. In abutilons, too, we now have varieties of compact habit and free blooming qualities that are greatly better than the old weedy sorts. One of the best of these is the golden yellow sort called Golden Bells. This is of dwarf habit, and very profuse in the production of its golden bells. Another dwarf-growing variety adds the charm of variegated foliage; this is Eclipse. *Abutilon Darwinii* is also well suited to house culture. Window gardeners are very commonly advised not to try the culture of hard-wooded greenhouse shrubs like the camelia, but some of the finest specimens of camelias I have seen were in the hands of women gardeners, who, by attention to their wants, always had fine blooms and good plants.

The chief points to observe in the house culture of camelias is to avoid a high temperature in winter, keep the leaves clean of dust by sponging them, and avoid injury to the roots by over-watering or extreme drought. The pots should be plunged in a bed of coal ashes in a moderately shaded place out-doors in summer. After the bloom is over in spring, encourage a rapid growth by giving a warmer spot and more sunshine, and an occasional dose of lime water. The lime water drives out earth-worms and encourages the growth of camelias in a wonderful manner. Remember that during winter a few degrees of frost will do less harm to a camelia than a high temperature, which will cause it to drop its buds. Most of the red and pink colored sorts are more hardy and better growers than the double white camelia. The *Camelia Japonica* is nearly a hardy plant, and should be treated accordingly. In the latitude of Raleigh, on dry, sandy soil, it thrives finely in open air culture, though at times exposed to a temperature of 15° above zero. Some of our hardy shrubs, particularly *Deutzia gracilis*, if lifted and potted in the fall and kept in a cool, light cellar until a few weeks before the flowers are wanted, will bloom finely in the sitting-room window. A very attractive Easter display can be made by any women by having some *Deutzia gracilis* potted in autumn, and bringing them into a warm room about five or six weeks before Easter, so as to give them time to develop their pretty white bells in profusion.

Violets can easily be had in cold climates in winter by setting some pot-grown plants in a roomy window box, in a sunny window of a room where no fire is kept. Cover the box at night with an old blanket to prevent hard freezing, and give all the sunlight possible. Or what is better, a little frame covered with an old window sash in a sunny place in the back yard, carefully covered at night, will give a great supply of flowers. The plants used should have been grown in pots during the summer and planted in the frame in September, and the sash kept off until frosts come. I have known many women in the city to get large supplies of violets from their back-yards by a careful use of a cold-frame. Not only sweet violets, but pansies can be grown in the same way, and when frosts are not too severe, mignonette and candytuft can also be grown thus.

A large winter supply of white flowers can be had from a little frame in a back yard planted in spring with the perennial candytuft, *Iberis Gibraltarica*. Allow it to grow all summer and completely mat over the bed. Late in fall put a sash over it, giving plenty of air on sunny days and cover from frost at night, and it will bloom all winter through. In North Carolina it blooms all winter in the open air. By potting strong plants early in the fall, these will also bloom well in a sunny window in-doors.

One of the most showy plants for Christmas bloom is the old *Linum trigynum* (*Reinwardtia trigyna*), the three-styled yellow flax. Small plants of this set out in the garden in spring and pinched into shape during the growing season, may be lifted in the fall and potted for the window. They will, by Christmas, be a complete mass of large, yellow, saucer-shaped flowers. This is a very old plant, but much neglected of late years. It is easy to grow, and very showy when in bloom. Many hardy herbaceous plants, particularly the dwarf-growing campanulas, can be treated in the same manner. Among handsome pot shrubs for house culture, many of the myrtles are very attractive, and I have seen them in very handsome condition in window gardens. Eight or ten are in cultivation, some very tender and others quite hardy. *Myrtus regia*, a South American species, has handsome foliage and profuse fruit, of a pleasant odor and taste. *Myrtus communis*, from the south of Europe, is a handsome white-flowered scented shrub much grown in pots by Germans in some of our cities.

The large and interesting cactus tribe furnishes many grotesque and showy plants for the window garden, but as these have already been fully treated in the pages of THE AMERICAN GARDEN in the past three months, I will not enlarge upon them.

Raleigh, N. C. W. F. MASSEY.

TWO HOUSE-PLANT NOTES.

FERTILIZERS FOR HOUSE PLANTS.—One of the chief causes of failure in the growth of plants in window gardens is the want of sufficient food supply in the soil used. If a rich garden soil is used with an addition of leaf mould, partially decomposed stable manure or half-rotted turf, we have a fairly good soil for some kinds of plants. A good formula for making up a soil for house plants is this: equal parts of rich garden soil, leaf mould from the woods, or half-rotted turf, and partially decayed stable manure. For some plants, like the begonias and gloxinias, a little sand should be added to make the compost more porous.

Yet, notwithstanding the fact that the soil contains so much of plant food, by improper watering, or by other conditions, it does not seem to be available for the growth of the plants, and they are weak and fail to grow or bloom.

Under these conditions chemical fertilizers are of great value. Such substances as fine ground bone, sulphate of ammonia, nitrate of potash, dissolved bone-black, liquid ammonia, and perhaps a little sulphate of potash, are useful. These may be incorporated in the soil when it is mixed together. Some of them, however, must be used with care.

Fine ground bone and dissolved bone-black may be used freely without injury to the plant, but the soluble salts, like sulphate of ammonia, nitrate of potash and sulphate of potash can only be used in small quantities, say a tablespoonful to two quarts of soil.

The above salts may be used in a liquid form or by stirring a small quantity into the surface of the soil in the pots or boxes. One of the salts alone will sometimes give good results, but generally the best growth is obtained by using potash, nitrates and phosphoric acid together The first two may be obtained from the nitrate of potash, often with good results; or by combining the sulphate of ammonia and sulphate of potash. The latter will probably give the best results. The phosphoric acid is obtained from the bone or bone-black, and as it is not quickly soluble it must be incorporated with the soil when the latter is made up, or this fertilizer may be mixed in on the surface of the pots or boxes so that it will wash down to the roots.

The specially prepared plant or flower foods are very useful and easily applied; but they are more expensive than the chemicals, and are to be recommended only to those not familiar with the latter.

For the production of flowers only the ground bone and dissolved bone-black should be used, and for a foliage growth potash and the nitrates; but neither alone will give the best results. If flowers are desired let the root space be small and the soil contain an excess of phosphoric acid; if foliage, give the roots more room and more of the nitrates than phosphoric acid.

If one has the proper varieties of plants and gives them plenty of food, water and sunshine, and especially a love which shall detect their every want, there need be no fear of not having an abundant supply of blossoms from November to June.—S. T. MAYNARD, *Massachusetts Agricultural College.*

HOW TO GROW FERNS INDOORS.—No plants are more suitable for indoor culture than ferns, and few are more popular. Those who have not had much experience in their treatment will not object to a few hints.

There are two methods by which ferns may be cultivated, viz., in the open fernery or in closed cases; but before adverting to either, it may be advisable to give a few directions for raising ferns from spores.

The German gardeners take a piece of turfy peat, about an inch and a-half square; this they dip in boiling water in order to destroy all animal life which it may contain; it is then laid in a flat saucer, and the spores are sprinkled on the upper side. A small quantity of water is poured into the saucer and the whole is then covered with a bell glass. A little water should be added from time to time to compensate for evaporation, but great care must be taken to pour it in without washing the spores from the turf. In five or six weeks the young ferns will appear in the form of a green, moss-like substance covering the surface of the peat. It is a curious fact that fern spores which have been gathered and kept dry for several years will, when sown, germinate more readily than fresh spores. Some persons employ porous sandstone instead of peat, to which, however, there is the objection that fungus germs often prevent the development of the spores. Fine cinders, when fresh, contain no fungi, and a mixture of these and fine light soil answers the purpose even better than peat, since good drainage is afforded, and this is very necessary.

The cultivation of ferns in the open air demands but little attention. A shady situation, if possible, in the vicinity of a pool or stream, will grow almost any ferns, provided the soil is light and porous, and well drained. Ferns may be grown in pots with great success. The common deep stone flower-pots serve the purpose quite well if they are glazed or painted to prevent rapid evaporation of moisture.

The rock-loving species are best grown in a mixture of broken bricks, old mortar and sandy loam. They should receive a plentiful supply of moisture during summer.

Many species are impatient of moisture about their crowns, so that it is a good plan to keep the crowns elevated to the level, or a little above the level of the pot. We have found that all the plants which require transferring to larger pots, an operation which becomes essential every year or two, will thrive best if transferred in early spring.

The form of a fern case may be accommodated to individual taste. As an outline for the general structure of such a case, we take a strong wooden box, 30 inches in length, 17 inches wide, and 5 inches deep. Cover it well, inside with pitch or coal tar, and outside with paint. At one end and on a level with the bottom insert a small wooden plug. This will allow any superfluous water to be drawn off, should such accumulation occur. Lay on the bottom one inch of any drainage material, then fill nearly level with light fibrous soil. In this the ferns may be arranged. The glass covering should never fit down tightly on or around the box so as entirely to exclude the air, which when not allowed to circulate freely gives the glass a steamy, clouded appearance.

It is by no means essential that an elaborate case should be constructed at great expense to cultivate a few ferns. For a few cents a very respectable cottage fernery may be established.

Nor is it at all necessary to keep living rooms at a high temperature in order to have a cheerful window of these plants in winter. Many of them are hardy evergreens, and flourish most luxuriantly when the ground is frozen around their stems.

Window ferneries should not be exposed to the direct rays of the sun even in winter. A north window is a good position for a case ; yet we have found almost invariably, by observing ferns in their native haunts, that they were more luxuriant where exposed chiefly to light from the northwest.—Mrs. J. T. Power, *Kentucky*.

CARNATIONS AS WINDOW PLANTS.

HE carnation is often thought to be a difficult plant to grow in the window garden. I think that the following suggestions will aid those who wish to grow this most handsome flower.

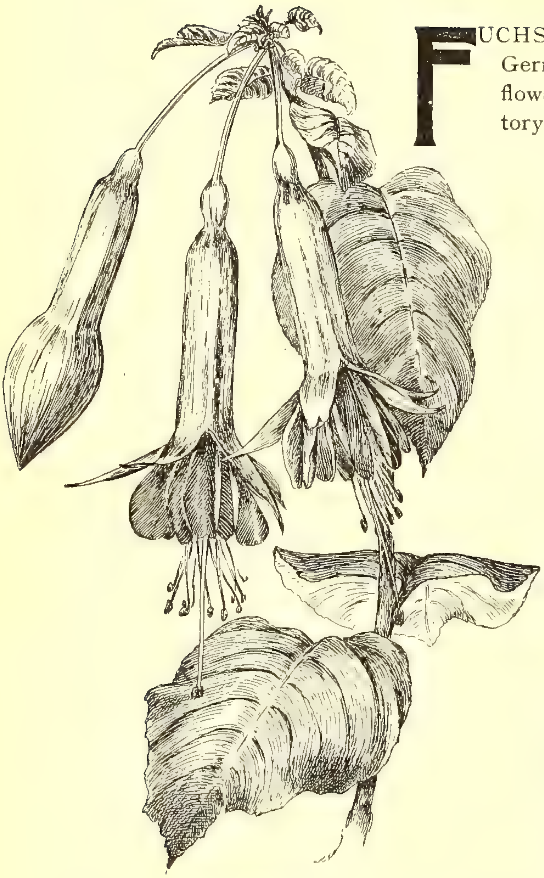
The variety chosen is of great importance. Plants of compact growth, and generally of dwarf habit, are much the best. We would mention the following varieties as being eminently suitable for pot culture ; Sunrise, variegated yellow and red ; Portia, scarlet ; Buttercup, yellow, striped with scarlet ; The Century, carmine ; Tidal Wave, light carmine ; Seawan, crimson ; Orient, crimson ; L. L. Lamborn, white. There are many others, but these all make handsome plants and embrace the important colors. Of course the more rampant growers like Grace Wilder, Edwardsii, Phila. Red, Crimson King, Chester Pride, etc , may be grown in pots, but they never make such fine looking specimens. The largest and finest clumps alone should be selected for potting.

The requirements of the plants are simple enough—not too wet feet, a moist atmosphere, cool temperature, and plenty of light. But to combine these essentials in a living room is another matter, and calls for the utmost skill on the part of the cultivator. Give them, then, the sunniest window, and set them close to the glass. Water carefully and only when dry ; do not over-water. Let them occupy the *coolest* window in the room, not forgetting the admonition as to light. A moist green-house atmosphere in a living apartment is an impossibility, and this no doubt is generally the cause of failure. Many plants will thrive fairly well in dry air—the carnation, we may say, never. Disease, insects, fungoid growths, death, follow in their natural sequence. It is an essential matter then to have large, robust, healthy plants, well along in bud. Such plants are more likely to withstand the unusual conditions to which they are about to be subjected. Frequent sprinklings of the foliage will counteract the dryness of the air in a great measure : and brushing the leaves, keeping them as free from dust as possible, conduces to the health of the plant.

The green-fly, or aphis, and the red spider are the great enemies of the carnation, but these are nearly always brought on by improper conditions and an unhealthy growth. A strong tea made from tobacco stems will destroy the aphis. The red spider is not so easily disposed of, but a weak solution of sulphide of potassium will kill it if persistently applied.

Penna. W. R. Shelmire.

THE FUCHSIA.



FUCHSIAS were named in honor of Leonard Fuchs, a celebrated German botanist. There are many varieties of these lovely flowers which now differ greatly from their ancestor, whose history is very interesting. An English sailor lad, in the course of his travels, found this pretty plant in South America, of which country it is a native. He remembered that his mother was fond of flowers, and thought to take her something which would be rare. Thus the first fuchsia was carried to England.

Mr. Lee, a well-known florist of London, first gave them to the public in the year 1774. He only learned of them by chance through a customer, who said:

"I saw in a window at Wapping a prettier flower than all your greenhouses can produce. The flowers hung like tassels from the drooping branches; their color was of the richest crimson, and in the center were folded leaves of the brightest Tyrian purple dye."

Mr. Lee was naturally excited over the description of this flower, the like of which he had never seen. He eagerly asked the exact locality of this particular window in Wapping, and at once hastened to see the novelty which his enthusiastic customer had described so well.

Sure enough, he had nothing in his conservatories to equal it. He knew in a moment its value and determined to secure it at any price. Knocking at the door he inquired for the mistress of the plant in the window, and upon her appearance at once offered to pay her whatever price she chose for her plant. But she refused point blank to sell it. Her dear sailor boy had brought that for her from far away over the sea, and she could not think of parting with it. It might be his last gift to her, who could tell? It was a keep-sake and she would not part with it.

Mr. Lee was more determined than ever to become possessed of this novelty; so diving into every pocket he pulled out gold, silver, and copper; altogether he counted out a neat little sum amounting to more than eight guineas. He spread the money out before her, and said:

"All this money is yours and the plant is mine. I'll give you one of the first cuttings I raise; and when your boy returns the plant will be quite as handsome as this one."

Money carried the day, and the woman, although unwilling, finally consented to part with it; while Mr. Lee, fearing, no doubt, but she would change her mind, hastily departed, taking with him the coveted plant. He at once proceeded to grow new plants, and having cut the fuchsia into joints, he planted these in hot-beds. He found that the pieces rooted easily, and it is said that in the short space of two months he had been so successful that he was the happy possessor of three hundred plants!

The first plant that bloomed was of course displayed in his show window. Here it was seen and admired by no less a person than a Duchess, and he sold it to her for a guinea. That very night My Lady gives a reception, and of course her rare and beautiful plant attracts much notice. So the next day brings Mr. Lee many customers, but unfortunately for him, only two plants were in bloom; still, many are engaged, and before the next three months he had made a clear gain *of three hundred guineas* upon the fuchsia!

Whether he kept his promise to the woman, or if her new plant was as handsome as the original, I cannot say; but we will hope for her sake that it was. This particular species of fuchsia is very seldom seen now, and is very inferior to the varieties now in cultivation.

There is a beautiful new fuchsia called "Storm King," which is considered by some to be by far the finest fuchsia yet produced. It is very double and of what is termed the weeping class, and it is always in bloom. The branches droop very gracefully and the blossoms are enormous. The buds sometimes take two weeks to expand and are of a glowing scarlet. The flowers are almost pure white, capped by a calyx of scarlet, and one can hardly imagine a more beautiful sight than one of these plants well covered with buds and blossoms.

Fuchsia fulgens is an old variety, but it is always a favorite, once its aquaintance is made. It is difficult to raise this variety from cuttings, but if planted out in summer and the buds pinched off so that it is not allowed to bloom the plant may then be carefully lifted in the fall and taken into the window garden, where it will bloom in February. This fuchsia has tuberous roots, something like the dahlia. The flowers are about four inches long and grow in clusters. The tubes and sepals are rose in color, the corolla crimson, and the leaves are large and light green.

There is no plant more easily cared for in the window garden than the fuchsia. Only be careful to put the pot in the sink and shower it plentifully with warm water at least once a week. This is very necessary, as the red spider has a particular fondness for this plant. This little pest may be kept down by showering frequently, and also spraying the inner surface of the leaves with a rubber plant-sprinkler. Fuchsias delight in a rich, light soil, and plenty of water. It is not necessary to have the sun directly upon them, and I have always found that they bloom much better than when not very near the glass, as they do not require a very high temperature; but with plenty of light and air they are well suited to the living room. Those who can procure black earth from the woods will find that it is just the soil best calculated to make a luxuriant fuchsia, if a little sand is mixed with it.

Old plants of *Fuchsia speciosa* and Mrs. Marshall will bloom abundantly in January, and young plants ought to begin blooming about the same time. The young plants should not be allowed to become pot-bound. This you can easily tell by knocking the pot a little and turning out the whole ball of earth without disturbing the plant. If the roots are curled round on the outside of the ball of earth, you may be sure that your fuchsia needs more room, and a pot two inches more in diameter will be about the right size. They are very easily raised from cuttings, which strike root readily in damp sand; but in California, where they almost grow to be trees, and easily cover a fence two feet high or more, when trained to do so, it it only necessary to break off a piece at a joint and stick it in the ground, and before long, behold! you have a fuchsia ready to bloom. In the window garden the young plant after having taken root in the damp sand should be transplanted into a small pot of rich, light soil, and always watered with *warm water*.

The double fuchsias are of course the handsomest, and, although belonging to the class that bloom most in summer, they may be made to bloom during the winter months by allowing them to rest during the summer. This is done by keeping them in the shade with very little water until October, and by pinching off the buds.

Fuchsia speciosa is said to bloom nine months out of the year.

Below is a list of the most satisfactory fuchsias for the window garden: *Fuchsia speciosa*, Earl of Beaconsfield, Mrs. Marshall, Carl Halt and Rose of Castile.

These all bear single flowers; of the double varieties I advise the following: Elm City, Monstrosa and the new Storm King.

Omaha, Neb. JUAN.

TENDER PLANTS WITHOUT ARTIFICIAL HEAT.

HAVING had considerable success in growing a large number of tender plants, without artificial heat except two windows in the house, I will try to tell your readers how it is done.

Starting about June 1st, I set out several plants of three or four varieties of alternantheras and also several varieties of coleus. (I think it better to grow the coleus in pots all summer if you can take proper care of them.) In the fall, before frost, I put them in pots and keep them in cold frames as long as possible, say until October 1st. Then I place them in a sunny window.

March 1st I begin taking cuttings. I had some tin pans made about 1½ inches deep, six inches wide, and long enough for three of them to fill a window sill. I fill these with sand and place the cuttings as near together as possible, keeping the sand quite wet. During the day I leave them on the sill in the hot sun, and at night place them on a marble shelf over the stove, where the sand becomes thoroughly warmed. In a week every good cutting will be rooted and ready to be planted into boxes, or if they are coleus, into small pots. By the time the first crop of cuttings is rooted another will be ready to be taken from the old plants, and this operation I continue until I have all the plants needed.

The great difficulty after the plants are rooted is in knowing where to keep them before putting them in frames, which I do about May 1st. After the middle of March I can keep them in any sunny room without a fire, and by planting them near together in the boxes, I manage to grow a large number.

Last spring, from six clumps of alternantheras in five-inch pots, I grew over 1,200 plants, with a few plants of santolina and variegated alyssum, rooted the same as alternanthera. I grew *Pyrethrum aureum* and *Oxalis purpurea* from seed, and all these gave me sufficient plants for a large carpet bed. I wintered in cold frames 1,000 *Sempervivum Californicum*, which I used with the above.

The same season from six coleus I grew 250 plants, and, these with geranium Madame Salleroi, which I wintered in the cellar, and *Pyrethrum aureum*, made a fine display.

In the above manner I had over 3,000 plants, all of which cost me only the 30 cents which I spent for seed.

I would not advise anyone to undertake this unless they are willing to do lots of work in March and April, but if anyone wishes to try, my plan may be of some help to them.—Geo. H. Henderson, *Dover, N. H.*

MISCELLANEOUS NOTES.

Window Garden Literature.—Succeeding issues of The American Garden will contain an unusual number of bright and helpful articles upon house gardens. These are prepared by the best writers and should be read by everyone who wishes to brighten the home with plants and flowers.

Ferneries.—As the happy father said after his first baby was born, "How did we ever live without her?" so the plant lover will say of her fern case, "We can't do without it." If money is not plenty, make it yourself. Mine is composed of three half windows put together with glass, the top being hinged, and the whole put over a zinc tray. Broken crocks are in the bottom, then a layer of charcoal, and lastly the soil, composed of decayed leaves, meadow earth and sand. The walks in the fields with basket and trowel are no small part of the pleasure of getting your case ready. You will have to buy a fern or two of the florist, and make out with what you have. Begonias do very well. Partridge vine, lycopodium and moss will grow all around the tall plants, and make a lovely carpet. Get your case in order, and you won't have to raise the lid for weeks. Put your fernery before a window, and long winter days, especially if you have to stay in the house a great deal, try looking through the glass case, with its lovely growing things, to the snowy landscape beyond.—Sister Gracious.

How to Have Fine Window Boxes and Hanging Baskets.—Common planed inch lumber may be used for the boxes, which should be six inches deep, and about the same in width, with a length corresponding to the width of the window sill. The box will last longer if the inside is charred. To do this, cover the parts to be burned with paraffine oil and then burn it off. Paint the outside a pleasing color and place the box on the window sill and fasten with wire or screw eyes, or rest it on brackets if the sill be too narrow. The best soil for this box is composed of one part fine well-rotted manure, two parts common soil and a little sand. The following plants of upright habit may be used for the center: Begonias, double and single fuchsias and petunias; a variety of geraniums, flowering and scented, also the silver and scented-leaved; coleus of all sorts, dracænas and caladiums. The trailing plants for the edges and ends may be selected from the following list: Musk plant, lobelias, moneyvine, German ivy, thunbergia, maurandia, tropæolum, *Stevia serrata* variegated, cypress vine, lemon-scented verbena, green or variegated vinca, ivy geraniums and variegated thyme.

After the roots have used the plant food in the soil in the boxes, water them with liquid manure (rather weak), or it may perhaps be more convenient to use some plant fertilizer in the dry state for prolonging their beauty. Be particular about supplying sufficient fresh water, as window boxes soon dry out; a thorough soaking every evening during the dry season will, perhaps, not be too much: however, judgment must be used. Dead leaves and withered flowers should be removed, and perhaps a little trimming done if the plants crowd, otherwise, allow them to grow naturally.

For hanging baskets the same general directions will apply, especially in the line of watering, for they dry out even more quickly.—E. E. Summey, *Niagara Co., N. Y.*

Conservatory Pests.—I should much like advice as to the best method of exterminating the green aphis in my conservatory. This conservatory is attached to my dwelling and the use of tobacco smoke is therefore very offensive throughout the entire house. My gardener has tried steeped tobacco stems and dust, also fir tree oil, but with only indifferent success. Is there anything better?—P. B. J.

Everyone wants to know what to do with the numerous conservatory pests. Aphis or green-fly is one of the easiest to manage. Mealy-bug is almost unmanageable in small conservatories unless it is sponged off, and this operation is tedious and uncertain, because the insect delights in hiding itself in the axils of leaves and other inaccessible places. In establishments of some extent, where the hose can be used freely, it can be dislodged and kept in check; and this method will check the advance of the white-fly or aleurodes, and the spotted or black mite, while for red spider thorough wetting is itself a specific. But in the window garden the hose cannot be used freely even if hose facilities should exist; and this forceful watering is also liable to injure some flowers.

Happily, we now have a specific for all these pests, which is not offensive, not poisonous and is easily applied. It is an alcoholic decoction of pyrethrum, made as follows: one part by weight of *fresh* pyrethrum is placed in four parts of alcohol. Let stand for about eight days, shaking occasionally. Then filter, and apply with an atomizer. This is "sure pop" to the mealy bug. The mealy coat of the insect repels substances applied dry or in water, but the alcohol "strikes in" and carries the pyrethrum essence with it. Aphis succumbs at once, and even the spotted mite, the most pernicious of all greenhouse pests, cannot resist it. An ordinary perfume atomizer with a long delivery nozzle, purchased at the drug store, applies it nicely. We have one filled with the decoction always standing on our table, and as soon as any bug presents himself we dispatch him. The mealy bug will stick to the plant even after he is dead, and if one objects to his carcass it can be removed with a small stiff brush. Coleuses, jacobinias, the trailing vincas, and *Cyperus alternifolius* are particular favorites with this pest.

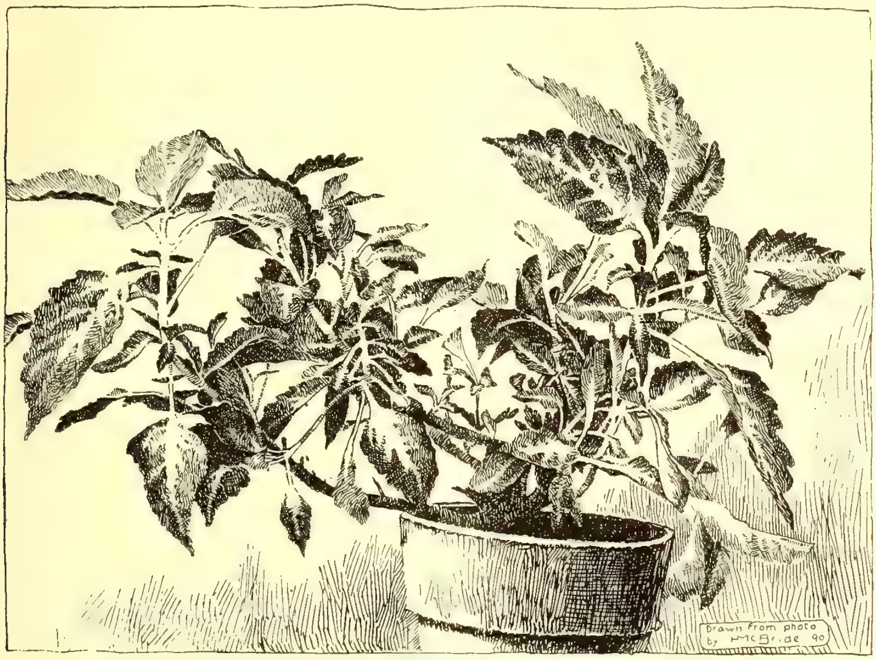


FIG. 2. A CONVALESCENT COLEUS.

The application of this decoction to greenhouse pests was first made, so far as we know, by Professor Comstock, of Cornell University. He has an insectary—a greenhouse for the purpose of breeding insects—and the pests appreciated his efforts to such an extent that they overran everything and it was feared that they would even attack the redoubtable professor himself! The professor's position was a peculiar one. He could not fumigate, else he would destroy insects which he was breeding. Substances almost without number were tried upon the mealy bug, but the decoction of fresh pyrethrum, which had been used for other purposes, was found to be the only one which is thoroughly reliable. It is too expensive for general use in commercial establishments, perhaps, but for specimen plants and window gardens it is the best insecticide. It is possible that the decoction will have to be diluted for some plants. This point is not yet well tested.

WHAT AILS THE COLEUS ?—I procured some thirty or forty named coleuses last spring. They were given careful attention, yet a number of them made no satisfactory growth. They grew slowly; the leaves were small and pale and fell off before they were fully grown, so that the plant bore only a few leaves at the ends of the stems. Occasionally a plant would appear to recuperate, but instead of sending up one or two strong central stalks, it remained low and diffuse, as in Fig. 2, with a tendency to make many puny shoots; and the roots were all near the surface, so that the plant was unsteady, and fell over easily when watered.

An examination of the roots in the first stage suggested the cause of the ailment. A large, bunchy, irregular swelling comprised nearly the whole root (Fig. 1). A microscope examination at once revealed myriads of the little nematodes which are now known to cause the root-knot of the peach in the south, and similar diseases of tomatoes, begonias and other plants. The diseased root appears to decay and fall away after a time, new roots are sent out just under the crown, and the second or recuperative stage begins. But unless the plants are repotted and set deeper, a permanent growth is not likely to follow. But it is always better to discard the plants at once — taking cuttings for new plants, if necessary— and to exercise special care that the soil does not become mixed with the potting earth. The nematodes are very serious pests.—L. H. B.

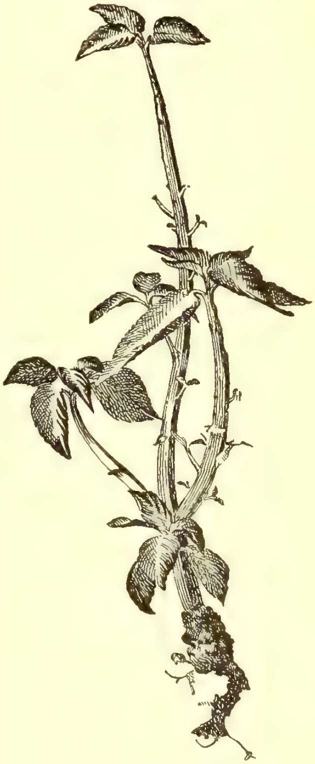


FIG. 1. A SICK COLEUS.

THE HYACINTH. — This is one of the sweetest scented flowers that can be grown in the greenhouse or dwelling room during the winter months. The plant is a general favorite and many varieties of different colors can now be obtained.

The culture of this flower is very simple, and those who intend to grow it through the coming winter should now think of laying in their supply of bulbs. This plant delights in a light rich soil; and this can be easily prepared by adding a small quantity of well-decayed cow manure to a sufficient amount of good loam. Then mix in sufficient sand to afford good drainage. Pots five inches in diameter should be selected. Place several small pieces of crock at the bottom for drainage and fill with the above compost, pressing it rather firmly. Then with the fingers make a hole in the centre of the pot of sufficient size to take one bulb. This is much better than pressing the bulbs into the soil, as they are less liable to be displaced during the formation of roots. The crowns should be just above the surface of the soil. When all have been potted they may receive a watering and then be covered six inches deep with ashes or some similar material; leaves are good to use if the covering is about twelve inches thick. The bulbs must be buried in some place where they are not liable to become frozen, as the object is to remove them, a few at a time, to the greenhouse to keep up a succession of flowers. The bulbs are buried in the manner described to start the roots in advance of leaves, without which good flowers cannot be grown.

A temperature of 55 degrees is sufficient for the purpose of forcing this flower. If it is desired, three bulbs may be placed in one pot, and when they come into flower the surface of pot may be covered with moss and the plants removed to the drawing room where they are sure to be appreciated. A neat stake should be inserted in each pot for the purpose of supporting the flower spike as it grows; without this support it is liable to fall over and become broken.

The hyacinth is also grown in water, and for this purpose vases are especially constructed. Fill the vase with water until it just touches the base of the bulb, then stand the vase in a dark place until the roots have grown about an inch, when the bulbs may be brought out and placed for a time in a shady part of the room.

The hyacinth may also be successfully grown in pots filled with sand instead of soil. September is the best month in which to purchase a supply of bulbs, and the middle of October is the best time to plant them.—H. W. SMITH, *La.*

HOW TO HAVE A PRETTY WINTER WINDOW WITH ANNUALS.—More than a dozen years ago I began raising flowers. I had no experience in caring for plants and supposed there was no way of getting a collection, except to buy of some florist, so I went to a neighboring city, hunted up a greenhouse, and invested somewhat heavily, for my means, in plants in small pots, letting the florist choose for me the sorts he thought an amateur would be most likely to succeed with. I tried to get some information from him about the care of the plants; and the thought he especially dwelt upon was not to keep them too wet. He said nothing about changing them into larger pots, and as it was early summer-time every plant, of course, dried out quickly on the veranda, but having had it so firmly impressed upon me that they were not to be kept "too wet" I let every one of them die for the want of water.

That was a discouraging beginning, but I did not give up keeping plants by any means, but started out on a different line. I sent to florists for catalogues and selected from these the plants with which I though I could succeed. I also subscribed for a horticultural magazine; but it was some years before I found that a very handsome collection of flowers for the winter window may be grown from the seeds of annuals and perennials. The cost of the plants will not be nearly so much as when bought already grown, and one has the pleasure of watching them from the start. And now after having an experience of some years with annuals in my window, I will mention some of the sorts with which any lady having an east or south window can succeed. I shall only mention in this article such as I think can be managed rather easily, though I have had snccess in growing from seed such plants as cineraria, clianthus, etc., that are more difficult to start Here is a list sufficient to fill your window with beauty and fragrance. Sweet alyssum, mignonette, nierembergia, *Salvia splendens*, Petunia—the fringed varieties are lovely—*Torenia Fournieri*, stock, browallia. These are for pots, shelves, or brackets. For hanging baskets, the best are lobelia, mimulus, thunbergia, Kenilworth ivy, nasturtium. The best climbers are *Cobæa scandens*, mormordica, lophospermum and abobra. As I am writing more especially for the benefit of those ladies whose love of flowers is deeper than their purses, I will say that if two, or even three club together in buying the seed there will be sufficient in the packets for all.

In this climate, Minnesota, I start the seeds for winter bloom by the middle of July, as I like to take the plants into the house during the last of September, so that they become somewhat accustomed to the changed conditions before fires are started. Having secured your seed from some reliable dealer, the next thing in order is to prepare your box for sowing them. I use a wooden box about 21 inches long, 16 wide, and 9 deep, as that gives room for all the seeds and it is easier than sowing in separate pots. After putting a layer of charcoal in the bottom of the box for drainage, fill it two-thirds full of soil composed of two parts good garden soil, one part sharp sand, and one part leaf mould. The soil should not pack nor become hard, for then the seeds will not do well. I sow the seeds in rows and keep the earth a little moist all the time—do not let them dry out once; cover the box with glass until the seeds are up. I use a cellar window for convenience. The cobæa seeds should be planted edgewise and by themselves, for they require more moisture in order to germinate well. Otherwise the treatment is the same. After the seeds are up raise the glass at one side and keep it propped that way until the little plants get well started; then remove, and after the plants are about two inches high transplant into the pots or whatever you wish to keep them in during the winter. I find tin cans holding about a quart a good substitute for pots; paint them some dull color. Try these, you who love flowers, and report your success —VERB ENA.

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